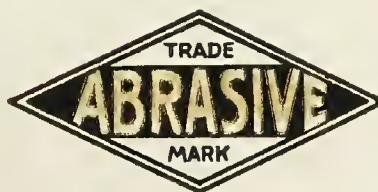


TJ1280

AN

ABRASIVE GRINDING WHEELS



ABRASIVE COMPANY
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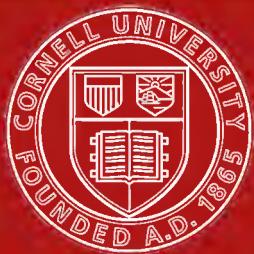
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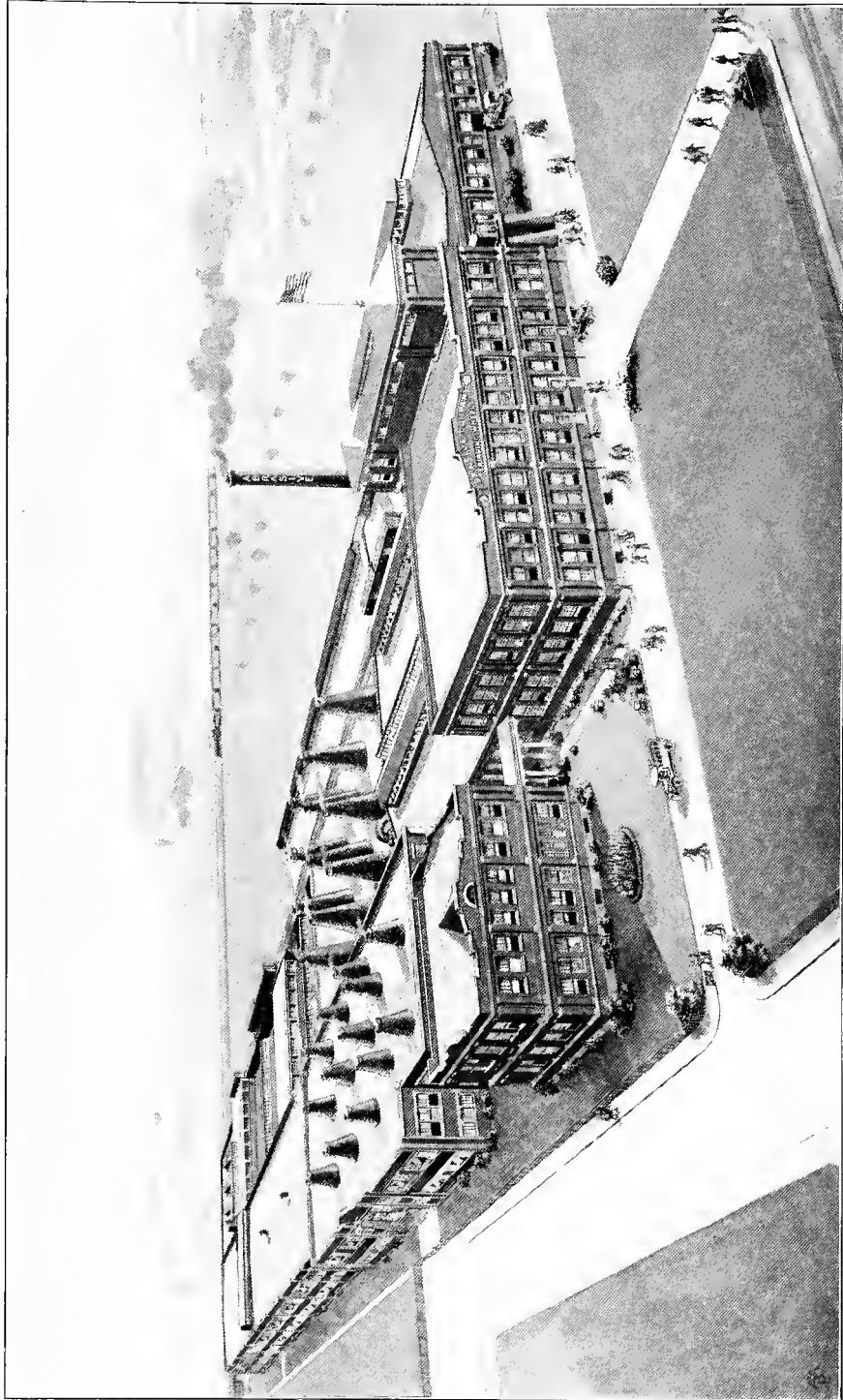
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Shop Motto

REMEMBER, MEN, you are building a wheel of QUALITY. Do your BEST, no matter how small your part in it, to the BEST of your ability, so that each wheel made will PROVE you have done so. You can bring this about by doing your best at ALL TIMES. One of the greatest enjoyments of life comes from doing things WELL.

The above is posted in every manufacturing department of the Abrasive Works. The sentiment expressed is reflected in the ultimate attainment of a quality product.



Office and Works, Bridesburg, Philadelphia

Incorporated under the laws of Pennsylvania, January, 1894

"Abrasive" Grinding Wheels



Manufactured by

**Abrasive Company
Philadelphia, Pa.**

Chicago Branch
566 West Washington Blvd.

U. S. A.

Main Office and Works
Tacony and Fraley Streets
Bridesburg, Philadelphia

Cable Address "Abrasive"

Lieber's and Western Union Codes Used

Catalogue No. 7



Borolon

TRADE MARK

REG. U.S. AND FOREIGN
COUNTRIES

Electrolon

TRADE MARK

REG. U.S. AND FOREIGN COUNTRIES

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Abrasive Products

Borolon Grinding Wheels

Electrolon Grinding Wheels

Borolon Rubbing Bricks

Electrolon Rubbing Bricks

Borolon Sticks

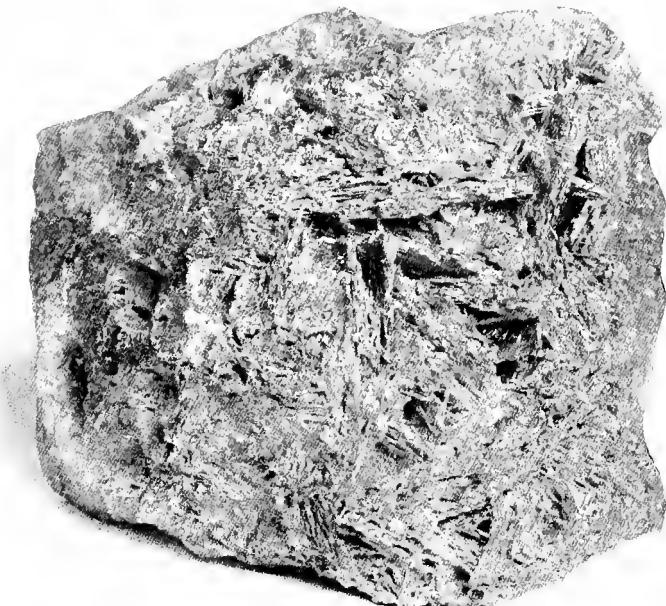
Electrolon Sticks

Borolon Grain

Electrolon Grain

Abrasive Grinding Wheels

ABRASIVE Grinding Wheels are made of Borolon or Electrolon. ¶ Both Borolon and Electrolon are products of the electric furnace, but are radically different in chemical composition, different in structure and character of fracture of the grain. ¶ Borolon is the most efficient cutting material known on materials of high tensile strength, such as all kinds of steel, but is suitable, however, for grinding many other kinds of metal. ¶ Electrolon is best adapted for grinding materials of low tensile strength, such as cast or chilled iron, brass, bronze, granite, marble, etc. ¶ With the use of the above abrasives we are prepared to furnish wheels for practically every class of grinding. ¶ Grinding wheels are made with each of these abrasive materials by four different processes of manufacture, namely, Vitrified, Silicate, Elastic and Rubber.



Borolon

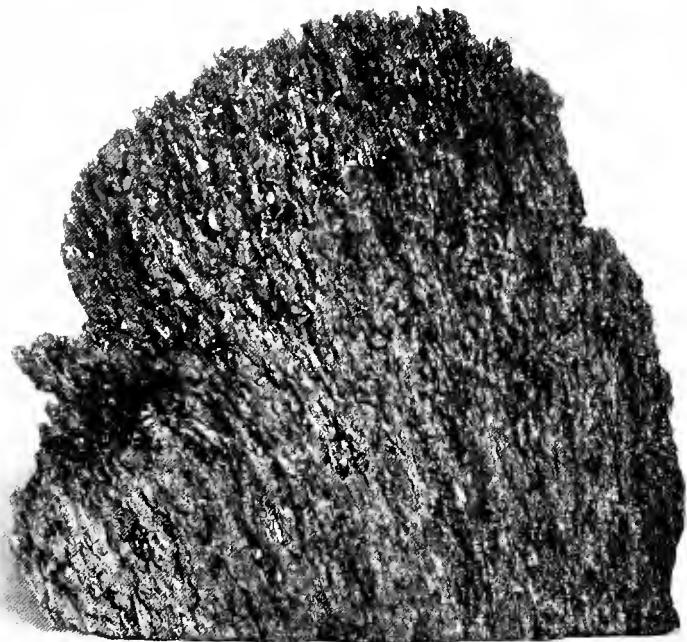
TRADE MARK

BOROLON is Oxide of Aluminum Al_2O_3 in crystalline formation. It is produced by fusing Bauxite in the intense heat of the electric furnace by what is known as the arc process. The richest and best Bauxite only is used in the manufacture of Borolon.

The purity of the material used and the process of its manufacture and control of crystallization make Borolon superior in quality, hardness, sharpness, uniformity and temper. The temper of this material can be varied according to the kind of grinding it is required to do. Its physical formation is such that it leaves sharp cutting points when fractured. This characteristic makes it most efficient for grinding all kinds of steel and materials of high tensile strength.

It possesses the property of resisting heat and can be used successfully in the manufacture of many kinds of refractories.

Bauxite, from which this material is made, was considered infusible until the arc process was adopted in electric furnace work. Under the influence of this great heat this material is melted and flows like water. The heat generated is estimated at about 2100° Centigrade, or about 3800° Fahrenheit. Any iron impurities in the material are vaporized and such impurities are, therefore, eliminated in the fused material. After the cooling operation the material is ready to be crushed into various size grains for manufacture into wheels.



Electrolon

TRADE MARK

ELCTROLON is Carbide of Silicon in crystalline formation. It is made of coke, sand, salt and sawdust, very carefully selected and proportioned. This mixture is heated in an electric furnace of the resistance type to a temperature approximately 2200° C.

By using the purest material and employing scientific methods, a wonderfully fast cutting abrasive material is produced.

Electrolon is in reality the hardest known abrasive. However, it possesses the characteristic property of brittleness, which makes it very efficient for grinding materials of low tensile strength.

Wheels made of *Electrolon* are recommended for grinding cast iron, brass, bronze, marble, granite, etc.

When the material is taken from the furnace it is crushed, graded and screened to the various grain sizes.

It is necessary to specially prepare Electrolon grain before it can be used in the manufacture of grinding wheels. Such treatment insures uniform quality.

Vitrified Wheels

TH E majority of the wheels which we manufacture are made by the vitrified process. The abrasive materials and bonds are mixed in specially designed machines. This material is then drawn into forms or molds of the required size, after which they are subjected to a drying operation which enables them to be formed or shaped to size. It is then necessary to further dry them, after which they are subjected to heats of a very high temperature, the temperature at which the bond in the wheel vitrifies. This is accomplished by means of specially designed kilns.

The time required to complete this stage of the manufacture is from ten to twelve days.

After vitrification in the kilns the wheels are ready for the finishing operation. They are trued on the sides and periphery to proper dimensions. This work is done by means of specially designed tools and machinery. They are then bushed to bore required, graded, balanced, tested and inspected.

Silicate Wheels

WHILE the vitrified wheels cover the general field of grinding satisfactorily, there are special cases where a closer bonded wheel is needed. Wheels of this kind are made by what is known as the tamping process. The abrasive materials and bonds are thoroughly mixed by means of specially constructed machines until they are in a perfect condition for manufacture. This material is then tamped firmly into molds. After the wheels are formed, they are then placed in specially designed ovens, and under the influence of heat the bond sets. This process requires but a short time, and we are prepared to make prompt delivery on this class of wheel.

The grade of hardness of silicate wheels is designated by letters of the alphabet, the same as vitrified wheels shown on Page 11 but with letter S added.

On work such as tool grinding, knife sharpening and surfacing work, wheels made by this process will give excellent results. On account of the comparatively low degree of heat required, this class of wheel can be furnished with a wire web, if required.

All wheels over 30 inches diameter are furnished in this process.

Elastic Wheels

ELASTIC or shellac wheels are made in molds, the large and heavier sizes being formed under heavy pressure. After being formed they are placed in specially constructed ovens and baked similarly to silicate wheels. They can be made as thin as $\frac{1}{16}$ inch up to 8 inches diameter, and $\frac{1}{8}$ inch up to 12 inches diameter. These wheels have some valuable qualities not attainable in any other wheels. As their name implies, they have a high degree of elasticity, making them valuable for work requiring thin wheels.

They will resist side pressure to a considerable extent, and easily withstand centrifugal strain that would burst ordinary wheels.

The bond is not harsh, but is elastic and resilient, making the wheel well suited to work requiring a fine finish.

These wheels may be run in water, caustic soda or dry.

Their high factor of safety makes them very popular for a large variety of light grinding operations, such as saw gumming, planer-knife grinding, grinding between the teeth of cast gears, die, cutter, reamer and roll grinding. They are also used advantageously for cutting off small stock, such as thin steel and brass strips, brass tubing, steel wire, and also for slotting purposes.

A great variety of special wheels for the shoe trade are made by this process.

Elastic wheels are also largely used in cutlery manufacturing.

Rubber Wheels

RUBBER wheels, as their name implies, are bonded with rubber. After being formed to shape by special machinery they are vulcanized. They can be made as thin as $\frac{1}{16}$ inch up to 6 inches diameter, and $\frac{1}{8}$ inch up to 12 inches diameter.

These wheels have very valuable qualities not attainable in any other wheels. They have a high degree of elasticity, are very tough, and possess a very high tensile strength, making them very safe to operate, especially on work requiring thin wheels.

They resist side pressure to a considerable extent and easily withstand centrifugal strain that would burst wheels made by other processes.

They can be made in harder grades than the elastic process wheel. In thin sizes, we generally furnish this process wheel, when it is not possible to make wheels of sufficient hardness by the elastic process. Being bonded with rubber, the wheels are not harsh but resilient, making them well suited to work requiring a fine finish. Their high factor of safety makes them valuable for slotting purposes, grinding between gear teeth and work of such nature. They are sometimes used by foundries for snagging purposes.

They are manufactured in two grades, 9 and 11. When made of Electrolyt the letter E follows the grade number, as 9E. When Borolon, the letter B, as 9B.

What is Meant by Grain and Grade

Grain

THE size or number of abrasive used is termed the wheel's degree of coarseness or fineness. The abrasive material after being crushed is graded to different sizes. These numbers are determined by the sieve or screen through which the material passes. No. 20, for instance, is that which passes through a sieve which has twenty meshes to the linear inch; No. 30, thirty meshes; No. 60, sixty meshes, etc. The degree of coarseness usually runs from about No. 8 to about No. 200.

Finer grades are known as Flours, but these are seldom used in wheels, being used mostly for rubbing and sharpening stones for very fine work.

Grade

GRADE means the hardness of the wheel or the resistance of the cutting particles under grinding pressure. A soft wheel is one where the cutting particles break away very rapidly under grinding pressure. A hard wheel will retain its cutting particles longer. The various steps or degrees of hardness from soft to hard are designated by letters. (See our grade list on following page.) The ideal wheel for any work is one that furnishes a new cutting face as fast as the particles in use become dull; in other words, the proper wheel will not glaze, but will remain sharp.

Abrasive Grade List

THE following grade list is used in designating hardness, and also serves as a comparison of grade between wheels made by the various processes:

<i>Vitrified Silicate Process</i>	<i>Elastic Process</i>	<i>Rubber Process</i>	<i>Classification</i>	<i>Code Word</i>
G . . Gs	$\frac{1}{2}$ E . .	Very Soft . . .	Gray
H . . Hs	$\frac{3}{4}$ E . .	. . . . . .	Go
I . . Is	1E . . .	. . . . . .	Goad
J . . Js	$1\frac{1}{2}$ E . .	Soft	Got
K . . Ks	2E . . .	. . . . . .	Gun
L . . Ls	$2\frac{1}{2}$ E . .	. . . . . .	Gave
M . . Ms	3E . . .	Medium . . .	Get
N . . Ns	4E . . .	. . . . . .	Gem
O . . Os	5E . . .	Medium Hard .	Girl
P . . Ps	6E . . .	. . . . . .	Glaze
Q . . Qs	7E . . .	Hard	Glimmer
R . . Rs 9	. . . . . .	Glue
S	Glad
U 11	Very Hard . .	Give
W	Extra Hard . .	Gad
Z	Extremely Hard .	Ground

Each letter or number represents a grade harder than the preceding letter or number; the words soft, medium, hard, etc., being only comparative and intended only for general guidance.

NOTE: Rubber wheels, when made of Borolon, will be marked with the letter B after the grade number, as 9B. Electrolon wheels, the letter E, as 9E.

Table for Selection of Grain and Grade

CLASS OF WORK	Borolon		Electrolon		PROCESS
	Grain	Grade	Grain	Grade	
Aluminum castings, general (hand)	30 to 46	4 to 5 Elas.	20 to 24	P to Q	Vitrified or Elastic
Angle irons	20	Q to R			Vitrified
Anvils (automatic surfacing)	24	O			Vitrified
Armatures (automatic cylindrical)					
Armor plate (surfacing)	46	M			Vitrified
Auger bits	14 " 16	Q			Vitrified
Axes (surfacing)	46	9 B			Rubber
Axes (hand edging)	30	R			Vitrified
Ball races (roughing)	20	R			Vitrified
Ball races (finishing)	46	K " L			Vitrified
Bath tubs, iron (hand surfacing)	60 " 80	3 Elas.	24	U	Elastic
Bath tubs, iron (hand edging)			24	U	Vitrified
Boiler plates	16	U			Vitrified
Brass castings (large)			20 " 30	P " Q	Vitrified
Brass castings (small)			30 " 46	O " P	Vitrified
Brass tubing (cutting off)			36	7 Elas.	Elastic
Brick (fire)			16 " 24	P to R	Vitrified
Brick (pressed)			16 " 24	P " R	Vitrified
Bronze castings (large) hand grinding			16	Q	Vitrified
Bronze castings (small) hand grinding			30 " 46	O " P	Vitrified
Bushings, steel (internal)	46 " 60	K to L			Vitrified
Bushings, steel (external)	36 " 46	K " L			Vitrified
Bushings, cast iron (internal)			46 " 60	K " L	Vitrified
Bushings, cast iron (external)			36 " 46	K " L	Vitrified
Cam shafts (bearings)	30	L " M			Vitrified
Cam shafts (roughing)	24 " 30	Q " S			Vitrified
Cam shafts (finishing)	46	K " L			Vitrified
Carbon (cutting off)	{ 46 or 24 comb.	or 3 Elas.	24	11 E	or Elastic
Car wheels			16 " 24	P to R	Rubber
Car wheels (chilled iron)			16 " 20	P " R	Vitrified
Car wheels (steel forged)	16 to 20	P			Vitrified
Cast iron (cylindrical)		J to K	30 " 46	J " L	Vitrified
Cast iron, hard white (hand grinding)			14 " 20	R " U	Vitrified
Cast iron (rough snagging, large castings)			16 " 20	R " U	Vitrified
Cast iron (rough snagging, small castings)			20 " 30	P " Q	Vitrified
Cast iron (finishing castings)			36 " 60	O " P	Vitrified
Cast iron (surfacing castings)			20 " 30	K " L	Vitrified
Copper (roughing)			24	6 Elas.	Elastic
Copper (finishing)			60 " 80	3 Elas.	Elastic
Crank shafts (finishing)	46	M			Vitrified
Crank shafts (roughing) from black forgings	24 comb.	M			Vitrified
	20 to 36	Q " R			

Table for Selection of Grain and Grade (Continued)

CLASS OF WORK	Boronon		Electrolon		PROCESS
	Grain	Grade	Grain	Grade	
Crank shafts (finishing) from rough grinding or machining	Comb. 24 or 46	M, N or O			Vitrified
Cylinders, cast iron (internal)			30 to 46	I to K	Vitrified
Dies (chilled iron)			24 " 36	O " P	Vitrified
Dies (hardened steel)	30 to 46	L to N			Vitrified
Dies (nail)	60 " 80	P " Q			Vitrified
Draw bars (hand grinding)	10 " 14	U " W			Vitrified
Drills, twist (automatic)	46	L			Vitrified
Drills, twist (hand grinding)	46	M			Vitrified
Drills, twist (high speed)	46	N			Vitrified
Drop forgings	16 " 30	P " R			Vitrified
Files (edging)	24 " 36	R " U			Vitrified
Fork tines (hand pointing)	24 " 30	U			Vitrified
Frogs and crossings (manganese steel)	14 " 16	Q " R			Vitrified
Gear cutters, carbon steel (automatic)	46 " 60	K " L			Vitrified
Gear cutters, high speed steel	36 " 46	K " L			Vitrified
General (rough grinding)	16 " 30	P " R			Vitrified
General (machine shop use)	24 " 46	O " P			Vitrified
Gun barrels, steel (automatic)	30 " 36	L " M			Vitrified
Hammers	24 " 36	P " Q			Vitrified
Hollowware (inside grinding)			24 " 36	Q " R	Vitrified
Internal grinding (cast iron auto cylinders)			30 " 46	H " J	Vitrified
Internal grinding (steel)	46 " 60	J " L			Vitrified
Knives (hog) automatic	30 " 36	K			Silicate
Knives (jointer) hand operation	46 " 60	L " M			Vitrified
Knives (leather shaving)	60 " 80	M " N			Vitrified
Knives (leather splitting)	24 " 30	1 to 2 Elas.			Elastic
Knives (meat chopping) hand operation	24	M to N			Vitrified
Knives (molding)	46 " 60	M " N			Vitrified
Knives (paper)	36 " 46	J " K			Silicate
Knives (planer automatic)	30 " 46	J " L			Silicate
Knives (planer hand)	36 " 60	L " M			Sil. or Vit.
Knives (planer, slot grinding in back, hand operation)	20 " 30	6 Elas.			Elastic
Knives (pocket) hand	100 " 120	O to P			Silicate
Knives (shear) automatic	24 " 30	M			Silicate
Knives (shear and shear blades)	36 " 60	K " M			Sil. or Vit.
Knives (shoe)	60 " 80	L " M			Vitrified
Knives (sticker) hand	46	M			Vitrified
Knives (table) automatic	50 " 60	4 Elas.			Elastic
Knives (veneer)	36	K			Silicate
Knuckles (cast steel)	10 " 12	U to W			Vitrified
Lathe centers	60 " 100	N " P			Vitrified
Links (hand iron chain) automatic and hand			20 " 24	U	Vitrified
Links (annealed chain) automatic	20 " 24	R " U			Vitrified
Machine shop tools (general)	30 " 46	O " P			Vit. or Sil.

Table for Selection of Grain and Grade (Continued)

CLASS OF WORK	Borolon		Electrolon		PROCESS
	Grain	Grade	Grain	Grade	
Malleable iron castings (large annealed)	12 to 20	Q to R			Vitrified
Malleable iron castings (large unannealed)			16 to 20	R to U	Vitrified
Malleable iron castings (small annealed)	20 " 30	P " Q			Vitrified
Malleable iron castings (small unannealed)			24 " 30	Q " R	Vitrified
Marble (roughing)			20 " 46	M	Vitrified
Marble (finishing)			180 " 220	I " J	Vitrified
Marble (coping)			20		Elastic
Milling cutters, reamers, taps, etc. (automatic)	46 " 80	J " M			Vitrified
Milling cutters, reamers, taps, etc. (hand)	46 " 80	M " O			Vitrified
Needles (automatic machine)	60 " 80	P " R			Vitrified
Pearl (roughing)			30 to 46	P " Q	Vitrified
Pearl (finishing)			100 " 150	M " O	Vitrified
Pistons (automatic)			24 " 36	L " N	Vitrified
Pistons (steel)	24 " 36	L " N			Vitrified
Piston rings (cast iron) surfacing sides—auto			36 " 46	M " O	Vitrified
Piston rings (cast iron) auto cylindrical			36 " 46	K " L	Vitrified
Plows, edging and jointing (steel)	16 " 24	P " R			Vitrified
Plow points (steel)	16 " 24	Q " R			Vitrified
Plow points (chilled)			20 " 30	Q " S	Vitrified
Plows, surfacing (steel)	16 " 24	P " R			Vitrified
Plows, surfacing (cast iron)			20 " 30	P " R	Vitrified
Pulleys, surfacing faces (cast iron)			24 " 36	L " M	Vitrified
Radiators, edging (cast iron)			20 " 30	Q " S	Vitrified
Rails (surfacing automatic)	14 " 16	P " Q			Vitrified
Razors (conceaving and grinding)	46 " 100	J " M			Vitrified
Reamers, taps, milling cutters (hand)	46 " 80	K " M			Vitrified
Reamers, taps, milling cutters (automatic)	36 " 60	I " M			Vitrified
Rolls (chilled iron) automatic roughing			24 " 36	4 " 6E	Elastic
Rolls (chilled iron) automatic roughing			30 " 46	L " M	Vitrified
Rolls (chilled iron) automatic finishing			80 " 100	3 " 4E	Elastic
Rolls (chilled iron) automatic finishing			80 " 100	K " L	Vitrified
Rolls (steel) automatic roughing	36 " 46	4 " 6E			Elastic
Rolls (steel) automatic finishing	70 " 80	3 " 4E			Elastic
Rolls (rubber) automatic roughing			24 " 30	L " M	Vitrified
Rolls (rubber) automatic finishing			60 " 80	L " M	Vitrified

Table for Selection of Grain and Grade (Continued)

CLASS OF WORK	Borolon		Electrolon		PROCESS
	Grain	Grade	Grain	Grade	
Sad irons (roughing) . . .			16 to 30	Q to R	Vitrified
Sad irons (finishing) . . .			80 " 100	P " Q	Vitrified
Saws, gumming and sharpening . . .	36 to 60	M to N			Vitrified
Saws, cold cutting . . .	46 " 60	O " Q			Vitrified
Shovels (surfacing) . . .	20 " 36	Q " R			Vitrified
Shovels (hand edging) . . .	24	U			Vitrified
Springs (spiral ends) . . .	16 " 24	P " Q			Vitrified
Springs (wagon ends of) . . .	16 " 30	P " R			Vitrified
Steel (soft cylindrical) . . .	24 comb.	L " M			Vitrified
Steel (soft surfacing) . . .	24 to 36	J " L			Vitrified
Steel (hard cylindrical) . . .	24 comb.	J " K			Vitrified
Steel (hard surfacing) . . .	24 to 36	H " K			Vitrified
Steel billets (hand) . . .	12 " 16	R " W			Vitrified
Steel castings (large) . . .	12 " 16	P " R			Vitrified
Steel castings (small) . . .	16 " 24	O " Q			Vitrified
Steel (hardened tools) . . .	30 " 46	N " O			Vitrified
Steel (internal grinding) . . .	36 " 60	J " M			Vitrified
Steel (manganese castings) large hand operation . . .	10 " 14	R " U			Vitrified
Steel (manganese castings) small hand operation . . .	16 " 24	Q " R			Vitrified
Steel (manganese safes) . . .	16 " 36	N " O			Vitrified
Steel (manganese frog and switch) . . .	12 " 16	P " R			Vitrified
Steel (structural) . . .	16 " 24	P " R			Vitrified
Steel (structural) hand operation . . .	12 " 16	Q " R			Vitrified
Stove mountings . . .	20 " 36	R " U			Vitrified
Taps (hand fluting) . . .	60 " 80	9B			Rubber
Taps (automatic sharpening) . . .	46 " 60	L " M			Vitrified
Tools (lathe and planer) roughing . . .	20 " 30	P			(Silicate or Vitrified)
Tools (lathe and planer) finishing . . .	46 " 60	N " O			Vitrified
Tools (high speed) . . .	46 " 60	N " O			Vitrified
Tools (granite and wood work- ing) . . .	36 " 46	N " O			Vitrified
Tubing (cutting off) . . .	36	7E			Elastic
Twist drills (hand) . . .	46 " 60	M " N			Vitrified
Twist drills (automatic) . . .	36 " 60	K " M			Vitrified
Twist drills (point thinning) . . .	46	3 " 4E			Elastic
Wood working tools . . .	46 " 60	L " M			Vitrified
Wrought iron . . .	16 " 30	R " U			Vitrified

NOTE—When two or more grains or grades are recommended for the same class of work, the coarser grain and harder grade or the finer grain and softer grade are suggested; for example, where 30 or 46 grain, Grade N or O, is specified the 30 grain, Grade O, or the 46 grain, Grade N, would be recommended.

Testing for Safety

THE system adopted by the Abrasive Company for the testing of grinding wheels is most thorough. Every possible precaution is taken to detect flaws, cracks, etc. Besides close inspections, the wheel is subjected to severe centrifugal strains on specially constructed testing machines, such tests exerting double the strain given when the wheel is operated at a normal speed. These special testing machines are equipped with tachometers, which accurately register the number of revolutions at which each wheel is tested. The number of revolutions each wheel is to be tested is marked on the manufacturing order. After each wheel is tested the operator signs his initials and date on such order and marks the wheel as being tested. He also makes record of such test on special form (copy of which is shown on the following page) to which he swears. When inspection is made of the wheels the tester's mark must show. This is further guarantee that the wheel has been tested. Records of test are kept for reference. These records contain dimensions of the wheel, grain, grade, factory order number; also state the number of revolutions wheel was tested. After wheels have been subjected to such tests and inspections, it can be assumed they are sound and safe for operation. Wheels do not break on account of inherent weakness or defects, but rather from rough handling in transit, improper mounting, allowing the wheel to run at high speeds when out of true, or catching the work between rest and wheel.

Instructions regarding the use and care of wheels, on Pages 24 to 26, will help you to avoid accidents.

Booklet entitled "Safety Code for the Use and Care of Grinding Wheels," as adopted by the Grinding Wheel Manufacturers in the United States, will be sent upon request.

Laboratories

A chemical laboratory is maintained by the Abrasive Company for the testing of all materials used. Close chemical and physical examinations of all raw materials insure us a uniform product.

We are constantly doing research work, which is of valuable assistance to our customers and serves to constantly improve all of our products.

Facsimile of Testing Sheet

Report of wheels tested 19

I hereby certify that I have personally revolved the wheels listed below at the number of revolutions shown thereon, same having withstood the test without developing any weakness or defect.

Tester

Personally appeared before me the said
this day of 19 .., and made oath that the
above statement is true to the best of his knowledge and
belief.

Notary Public

Order

To ABRASIVE COMPANY *Date*
Philadelphia, Pa.

Charge to Order No.

Address

For Order No.

Ship to Send Via

Address

Price Terms

Salesman's Order No. Letter

Refer Report

Quantity	Diameter	Thickness	Hole	Shape	Grain	Grade	Abrasive	REMARKS

When selection of grain and grade is to be made by factory, give complete description of operation in space below or on separate report form. This must include kind of material; size and shape of pieces; whether off hand, with or without steady rest, cylindrical or surfacing; wet or dry; make and type of machine; spindle speed and speed of work; amount of material to be removed and finish desired; give grain and grade of competing wheel, with results; and when possible send sample piece of satisfactory wheel.

Salesman.

Ordering

THE outline on opposite page is a facsimile of the order blank we have adopted and is recommended to our customers and the trade in general. To enable us to fill an order intelligently it is necessary for us to have the information called for in the blank, and if properly given, aids us very materially.

"Wheel Speeds" and "Work Speeds" are of vital importance in cylindrical grinding. Differences of speeds cause big differences in the working of wheels. Speed is a very important factor in grinding. When we know actual conditions we are in a position to recommend the speed at which a wheel should be run to give best results.

We often receive orders for wheels, giving only diameter and thickness, not even giving size hole required, and no description of the work, simply stating "for iron." We do not know whether the wheel is required for grinding pistons, burring castings or surfacing plates, all of which could be made of iron and each requiring a different grade of wheel. Different wheels are required for different operations, and it is a matter of vital importance for us to have as full a description of the work as possible.

WHEN ORDERING PLEASE STATE

Quantity required.

Diameter of wheels.

Thickness of wheels. If cup wheels, state width over all, thickness of rim and thickness of back or base. If cylinders, state width over all and thickness of rim.

Diameter of arbor hole.

Shape of wheel. If irregular in shape enclose sketch showing all dimensions. If no shape is stated and only dimensions given are diameter, thickness and arbor hole, it is understood plain, straight wheels with flat sides and square face are desired.

Whether the wheels are to grind flat surfaces or edges.

Whether the wheels are to be used on a machine which holds the work rigidly to the wheel or on one where the work is held to the wheel by hand or spring pressure.

Whether the wheels are to be used with or without water or other fluid.

Description of work to be ground; nature of the metal to be ground, wrought, cast or malleable iron, hard or soft steel, brass, etc., also shapes and weights of pieces and whether a fine finish is desired or not.

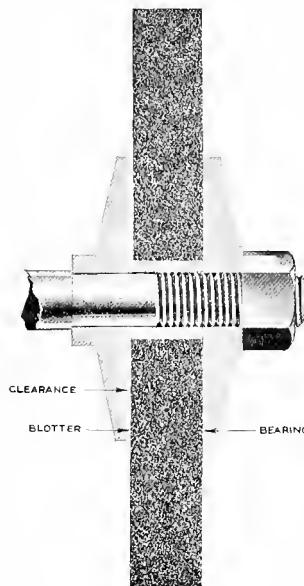
Speed of spindle, *i.e.*, number of revolutions it turns per minute.

Whether the work is to be revolved, and if so, at what speed.

Remove the grade tags on wheels and retain them for future reference.

Mounting

This cut shows the proper way a wheel should be mounted. The bearing is on the outer edge of the flanges. Flanges should be slightly recessed so as to leave ample clearance. We never recommend the use of straight, flat flanges. Do not mount wheels without flanges. If mounted with simply a nut it is liable to crawl and break the wheel. Do not screw nut too tight, just enough to prevent slipping. Do not crowd wheel on arbor, the wheel may be cracked or thrown out of balance. Do



not mount unless it is found to be an easy fit. Always tap a wheel lightly with a hammer before mounting, and if it does not "ring clear" do not use it.

Use some soft pad on each side of wheel. ABRASIVE wheels are labelled with blotters which are sufficient.

It is wise to have one man mount all the wheels, keep rests properly adjusted, oil the machines and keep wheels true.

Use a hood for protection wherever possible. Wheel should run toward the operator.

Minimum Sizes of Machine Spindles in Inches for Various Diameters and Thicknesses of Grinding Wheels

Diameter in Inches	THICKNESS OF WHEEL IN INCHES																		
	1/4	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	4	4 1/2	5
6	1	1	1	1	1	1	5	5	3	3	3	3	3	3	3	3	1	1	1
7	2	2	2	2	2	2	5	5	4	4	4	4	4	4	4	4	1	1	1
8	2	2	2	2	2	2	5	5	4	4	4	4	4	4	4	4	1	1	1
9	2	2	2	2	2	2	5	5	4	4	4	4	4	4	4	4	1	1	1
10	3	3	3	3	3	3	5	5	4	4	4	4	4	4	4	4	1	1	1
12	4	4	4	4	4	4	7	1	1	1	1	1	1	1	1	1	1	1	1
14	4	4	4	4	4	4	7	1	1	1	1	1	1	1	1	1	1	1	1
16	5	5	5	5	5	5	8	1	1	1	1	1	1	1	1	1	1	1	1
18	5	5	5	5	5	5	8	1	1	1	1	1	1	1	1	1	1	1	1
20	6	6	6	6	6	6	8	1	1	1	1	1	1	1	1	1	1	1	1
24	7	7	7	7	7	7	8	1	1	1	1	1	1	1	1	1	1	1	1
26	7	7	7	7	7	7	8	1	1	1	1	1	1	1	1	1	1	1	1
30	8	8	8	8	8	8	8	1	1	1	1	1	1	1	1	1	1	1	1
36	8	8	8	8	8	8	8	1	1	1	1	1	1	1	1	1	1	1	1

The Machine

USE heavy machines and have them firmly set on solid foundations. Users of wheels are particularly cautioned not to run them on shaky machines nor on machines in which the spindles have become loose in the bearings from wear. Vibration is wasteful of both wheel and power.

Keep the grinder clean. Dirt, oil or grease on the machine means a dirty wheel.

Collars or flanges should be *at least* one-third the diameter of the wheel. Smaller ones do not hold wheel firmly or safely. Use recessed flanges so that the outer edges of the flanges come in contact with the wheel.

Spindles should be amply large. Holes are recommended .005 inch full. Too light a spindle will spring and prevent true running.

Use rests strong and rigid and keep them close to the wheel, otherwise the work may drop between the wheel and rest and cause the wheel to break. We feel safe in saying that seventy-five per cent of breakages are due to work being caught in this manner.

Keep bearings well oiled. Heating and consequent expansion of spindles have caused breaking of wheels.

Protection Flanges for Safeguarding Grinding Wheels

WHEN grinding operations do not permit the use of protection hoods, we recommend the single or double tapered side wheel, protected by concaved flanges. These flanges should be recessed at the center. See accompanying table. They should be made of steel if over 10 inches in diameter; less than 10 inches may be made of cast iron. We recommend that they be made $\frac{3}{4}$ inch taper to the foot. This offers ample protection in case of wheel breakage. All flanges should be accurately turned, correct to dimensions and in balance. Both flanges in contact with the wheel should be of the same diameter. As the wheel wears down in diameter the flanges should be changed to conform with the size wheel—as given in table below.

Table of Dimensions of Tapered Flanges and Tapered Side Wheels Where Hoods are Not Used

A—Maximum flat spot at center of flange.

B—Flat spot at center of wheel.

C—Minimum diameter of flange.

D—Minimum thickness of flange at bore.

E—Minimum diameter of recess in taper flanges.

F—Minimum thickness of each flange for single taper at bore.

Diameter of Wheel in Inches	A	B	C	D	E	F
10	0	2	6	$\frac{1}{2}$	4	$\frac{1}{2}$
12	4	$4\frac{1}{2}$	6	$\frac{5}{8}$	4	$\frac{5}{8}$
14	4	$4\frac{1}{2}$	8	$\frac{5}{8}$	$5\frac{1}{2}$	$\frac{3}{4}$
16	4	6	10	$\frac{5}{8}$	7	$\frac{7}{8}$
18	4	6	12	$\frac{3}{4}$	8	1
20	4	6	14	$\frac{3}{4}$	9	1
22	4	6	16	$\frac{3}{4}$	$10\frac{1}{2}$	$1\frac{1}{8}$
24	4	6	18	$\frac{3}{4}$	12	$1\frac{1}{8}$
26	4	6	20	$\frac{3}{4}$	$13\frac{1}{2}$	$1\frac{1}{8}$
28	4	6	22	$\frac{7}{8}$	$14\frac{1}{2}$	$1\frac{1}{4}$
30	4	6	24	$\frac{7}{8}$	16	$1\frac{1}{4}$

Protection Hoods for Safeguarding Grinding Wheels

PROTECTION HOODS should be used wherever possible with wheels not provided with protection flanges. Hoods should be designed and constructed of a material sufficiently strong to retain all pieces of a broken grinding wheel. Hoods should conform as nearly as possible to the periphery of the wheel and should be so designed as to leave exposed the least portion of the wheel compatible with the work, and should be of the adjustable type or provided with a sliding tongue, or similar device, or a method of contracting the rim for the purpose of closing the opening in the hood as the wheel is reduced in diameter, to afford maximum protection at all times. Protection hoods should be securely fastened to the grinding machine or floor.

Protruding ends of the wheel arbors and their nuts should be guarded.

Although rigid inspection is made of all Abrasive Company's products before leaving the factory, nevertheless there exists the possibility of wheels being broken by accident; therefore we strongly recommend the use of protection hoods.

Table of Dimensions of Straight Flanges to be Used in Connection with Straight Wheels and Protection Hoods

A Diameter of Wheel Inches	B Minimum Outside Diameter of Flange	C Minimum Diameter of Recess	D Minimum Thickness of Flange at Bore
6	2	1	3
8	3	2	3
10	3 $\frac{1}{2}$	2 $\frac{1}{4}$	3
12	4	2 $\frac{1}{4}$	1 $\frac{1}{2}$
14	4 $\frac{1}{2}$	3	1 $\frac{1}{2}$
16	5 $\frac{1}{2}$	3 $\frac{1}{2}$	1 $\frac{1}{2}$
18	6	4	2 $\frac{1}{2}$
20	7	4 $\frac{1}{2}$	2 $\frac{1}{2}$
22	7 $\frac{1}{2}$	5	2 $\frac{1}{2}$
24	8	5 $\frac{1}{2}$	2 $\frac{1}{2}$
26	8 $\frac{1}{2}$	6	3 $\frac{1}{2}$
28	10	7	3 $\frac{1}{2}$
30	10	7	4 $\frac{1}{2}$

Use and Care of Wheels

USERS of wheels sometimes complain of their being unsatisfactory without investigating speed at which they are operated. A wheel will appear too hard and glaze if run at excessive speed, while at proper speed it may be satisfactory. Again, if run at a very low speed, it may appear too soft. Speed, therefore, is a very important factor. When above conditions arise, change the speed and it will often give satisfactory results.

If a wheel is unsuited for the work, do not use it; allow us to exchange it for one that is adapted to the work. In such cases, give us full information why it is not satisfactory. Avoid heavy pressure against the wheel and be sure to keep it true. For this purpose have a dresser ready to use when needed. Do not try to do all kinds of grinding with the one wheel. One size of twist drill will not bore all size holes; neither will one kind of a grinding wheel do all classes of work satisfactorily. It is economy to change wheels and use proper grades that suit the work.

A wheel that thumps does not cut on its entire periphery, and it is possible to have a wheel so badly out of true that it will lose a very large percentage of its cutting power.

It is wise to use a wheel for each class of work. The "general use" wheel may be handy, but it is like that man who is "Jack-of-all-trades and master of none."

Increase the speed as a wheel decreases in diameter, otherwise it may appear soft towards the center. Do not crowd the wheel. If too soft, it will wear away fast without doing any more work.

Never use a wheel at a higher speed than the manufacturer recommends. A surface speed of 5000 feet per minute is recommended as a safe grinding speed for grinding in general. See that the speed does not vary. It is sometimes not the same at all hours.

Don't blame the wheel for everything. Sometimes something else may be wrong. Don't tell the manufacturer a wheel is "no good." He can help you much more if you say why it is no good.

Don't work on a new wheel until you are sure it runs true.

Never "hack" wheels, as it is liable to break or crack them. Use a dresser for this purpose.

The user must realize that a grinding wheel which is required to cut fast, consequently to wear away, cannot possibly be made as strong as iron or steel. It, therefore, must be handled accordingly with care and precaution.

The most common causes of accidents are—catching the work between the wheel and rest; heating and expansion of arbor; using flanges too small; screwing them too tight and not having them properly recessed so that they bear on the outer edge; not using any flanges, but simply screwing a nut against the wheel, allowing the arbor to become loose in boxes from wear; and running wheels on shaky machines. Against all these conditions we particularly caution all users of wheels.

The stress on the wheel at a speed of 9000 surface feet per minute is about 250 pounds per square inch, and as the stress on a wheel running at 5000 surface feet per minute is about 80 pounds it will be seen that when wheels are tested at a speed of 9000 feet per minute, they are subjected to more than three times the strain they would receive at recommended running speed.

Wheels should not be run in excess of recommended speeds. As the centrifugal force of a body moving with different velocities in the same circle is proportional to the square of the velocity, it will be seen that if the velocity is doubled, the centrifugal force would be four times as great, hence the importance of not running wheels at a faster speed than is recommended by the manufacturer.

The same peripheral speed should be maintained as the wheel decreases in diameter. In other words, the speed of the spindle should be increased correspondingly as the diameter of the wheel is decreased. The increase of the peripheral speed as the wheel wears away can be accomplished by means of a variable speed counter-shaft or cone pulley on the grinder, or by transferring from a larger grinder to a smaller one as the wheels wear away.

The last system has decided advantage and is highly recommended whenever there is sufficient amount of grinding to warrant the use of more than one machine. These grinders should then have but one pulley on the spindle, which removes all possibility of starting a new wheel, when full diameter, at the higher speed.

When the single pulley system is not employed, great care and precaution should be taken to always start a new wheel on the low speed.

Don't start the grinder until you know the speed is right—not "near enough," but right. Even a slight variation in speed may be the cause of success or failure of any wheel. Failure is sometimes turned into success by merely changing the speed of either the wheel or the work.

Do not use a grinding wheel like a piece of cast iron. It is meant for work, but not abuse. Do not use hard wheels because they last longer. A fast-cutting wheel is the most economical in the end, even if it does wear away more rapidly. Output determines economy.

General Remarks About Wheels

AS compared with any other cutting tool, the successful grinding wheel possesses one interesting characteristic peculiar to itself—that of sharpening itself while it works. When properly made and selected, the grains on the surface of the wheel, as they become dulled, are either broken or pulled out under the stress of the work, thus continually presenting new, sharp cutting points. A wheel is, therefore, more efficient when soft enough to cut freely and yet not hard enough to glaze.

The use of modern grinding wheels has been extended from grinding a comparatively few metals to practically all metals. They are also used to grind such materials as bone, horn, pearl, rubber, marble, bronze, stone, wood, etc.; in fact, almost any material.

Increasing the surface speed of a grinding wheel decreases its tendency to wear away, and conversely, decreasing the surface speed increases its tendency to wear away.

Grinding wheel manufacturers occasionally hear the complaint that the wheel has "soft spots." If the user will mark the wheel where he thinks the "soft spot" is and then "true the wheel" and grind with it again, he will invariably find that the "soft spot" has moved along to another point on the wheel. Such complaints are most likely due to the wheel running out of true or out of balance.

Rules for Calculating Speeds and Diameters of Pulley

Proposed speed of grinding spindle being given, to find proper speed of countershaft.

Rule: Multiply the number of revolutions per minute of the grinding spindle by the diameter of its pulley, and divide the product by the diameter of the driving pulley on the countershaft.

Example: The driving pulley on the countershaft is 20 inches diameter, the pulley on the grinding spindle is 8 inches diameter and makes 800 R. P. M. How many R. P. M. does the countershaft make?

$$800 \times 8 \div 20 = 320 \text{ R. P. M.}$$

Speed of countershaft given, to find diameter of pulley to drive grinding spindle.

Rule: Multiply the number of revolutions per minute of the grinding spindle by the diameter of its pulley, and divide the product by the number of revolutions per minute of the countershaft.

Example: The pulley on the wheel spindle is 6 inches diameter and should make 1400 R. P. M. The countershaft runs at a speed of 650 R. P. M. How large should the driving pulley on the countershaft be?

$$1400 \times 6 \div 650 = 13 \text{ inches diameter of driving pulley on countershaft.}$$

Proposed speed of countershaft given, to find the diameter of pulley for the line shaft.

Rule: Multiply the number of revolutions per minute of the countershaft by the diameter of the tight and loose pulleys, and divide the product by the number of revolutions per minute of the line shaft.

Example: A line shaft running 231 R. P. M. is to drive a countershaft 660 R. P. M. The driven pulley on the countershaft is 7 inches diameter. What diameter should the driving pulley on the line shaft be?

$$7 \times 660 \div 231 = 20 \text{ inches diameter of pulley on line shaft.}$$

General Principle Used to Determine Speeds and Diameters

The diameter of any driven pulley multiplied by its speed in feet per minute always equals the diameter of the driving pulley multiplied by its speed in feet per minute.

Rules for Obtaining Surface Speeds

To find surface speed in feet per minute of a wheel:

Rule: Multiply the circumference (see table below) by its revolutions per minute.

Example: A wheel, 20 inches diameter, makes 955 R. P. M. What is the surface speed in feet per minute?

$$5.236 \times 955 = 5000 \text{ feet surface speed.}$$

Surface speed and diameter of wheel being given to find number of revolutions of wheel spindle.

Rule: Divide surface speed in feet per minute by the circumference. (See table below.)

Example: A wheel, 14 inches diameter, is to be run 6000 feet surface speed per minute. How many revolutions should the wheel make?

$$6000 \div 3.665 = 1637, \text{ number of R. P. M. wheel should make.}$$

Table of Circumferences

Diam. of Wheel in Inches	Circum. of Wheel in Feet	Diam. of Wheel in Inches	Circum. of Wheel in Feet	Diam. of Wheel in Inches	Circum. of Wheel in Feet
1	.262	21	5.498	41	10.734
2	.524	22	5.760	42	10.996
3	.785	23	6.021	43	11.257
4	1.047	24	6.283	44	11.519
5	1.309	25	6.546	45	11.781
6	1.571	26	6.807	46	12.043
7	1.833	27	7.069	47	12.305
8	2.094	28	7.330	48	12.566
9	2.356	29	7.592	49	12.828
10	2.618	30	7.854	50	13.090
11	2.880	31	8.116	51	13.352
12	3.142	32	8.377	52	13.613
13	3.403	33	8.639	53	13.875
14	3.665	34	8.901	54	14.137
15	3.927	35	9.163	55	14.499
16	4.189	36	9.425	56	14.661
17	4.451	37	9.687	57	14.923
18	4.712	38	9.948	58	15.184
19	4.974	39	10.210	59	15.446
20	5.236	40	10.472	60	15.708

Table of Grinding Wheel Speeds

Diam. of Wheel in Inches	Milli- meters	Rev. per Min. for Sur. Speed of 4000 Ft. or 1200 Meters	Rev. per Min. for Sur. Speed of 4500 Ft. or 1350 Meters	Rev. per Min. for Sur. Speed of 5000 Ft. or 1500 Meters	Rev. per Min. for Sur. Speed of 6000 Ft. or 1800 Meters	Rev. per Min. for Sur. Speed of 6500 Ft. or 1950 Meters
1	25	15,279	17,200	19,099	22,918	24,850
2	50	7,639	8,590	9,549	11,459	12,420
3	75	5,093	5,725	6,366	7,639	8,270
4	100	3,820	4,295	4,775	5,730	6,205
5	125	3,056	3,440	3,820	4,584	4,970
6	150	2,546	2,865	3,183	3,820	4,140
7	175	2,183	2,455	2,728	3,274	3,550
8	200	1,910	2,150	2,387	2,865	3,100
10	250	1,528	1,720	1,910	2,292	2,485
12	305	1,273	1,453	1,592	1,910	2,070
14	355	1,091	1,228	1,364	1,637	1,773
16	405	955	1,075	1,194	1,432	1,552
18	455	849	957	1,061	1,273	1,380
20	505	764	860	955	1,146	1,241
22	555	694	782	868	1,042	1,128
24	610	637	716	796	955	1,035
26	660	586	661	733	879	955
28	710	546	614	683	819	887
30	760	509	573	637	764	827
32	810	477	537	596	716	776
34	860	449	506	561	674	730
36	910	424	477	531	637	689
38	965	402	453	503	603	653
40	1,015	382	430	478	573	621
42	1,065	364	409	455	546	591
44	1,115	347	391	434	521	564
46	1,165	332	374	415	499	539
48	1,220	318	358	397	477	517
50	1,270	306	344	383	459	497
52	1,320	294	331	369	441	487
54	1,370	283	318	354	425	459
56	1,420	273	307	341	410	443
58	1,470	264	296	330	396	428
60	1,520	255	277	319	383	414

The R. P. M. at which wheels are run is dependent on conditions, style of machine and the work to be ground.

Wheels are run in actual practice from 4000 to 6000 feet per minute, in some instances as high as 7500 feet. We recommend for most grinding operations 5000 feet.

Table of Decimal Equivalents

of 8ths, 16ths, 32ds and 64ths of an inch

8ths	16ths	—	32ds	—
$\frac{1}{8} = .125$	$\frac{1}{16} = .0625$	$\frac{1}{32} = .03125$	$\frac{1}{64} = .015625$	$\frac{1}{128} = .0078125$
$\frac{1}{4} = .250$	$\frac{3}{16} = .1875$	$\frac{3}{32} = .09375$	$\frac{3}{64} = .046875$	$\frac{3}{128} = .0234375$
$\frac{3}{8} = .375$	$\frac{5}{16} = .3125$	$\frac{5}{32} = .15625$	$\frac{5}{64} = .078125$	$\frac{5}{128} = .039375$
$\frac{1}{2} = .500$	$\frac{7}{16} = .4375$	$\frac{7}{32} = .21875$	$\frac{7}{64} = .109375$	$\frac{7}{128} = .0546875$
$\frac{5}{8} = .625$	$\frac{9}{16} = .5625$	$\frac{9}{32} = .28125$	$\frac{9}{64} = .140625$	$\frac{9}{128} = .0703125$
$\frac{3}{4} = .750$	$\frac{11}{16} = .6875$	$\frac{11}{32} = .34375$	$\frac{11}{64} = .171875$	$\frac{11}{128} = .0859375$
$\frac{7}{8} = .875$	$\frac{13}{16} = .8125$	$\frac{13}{32} = .40625$	$\frac{13}{64} = .203125$	$\frac{13}{128} = .1015625$
	$\frac{15}{16} = .9375$	$\frac{15}{32} = .46875$	$\frac{15}{64} = .234375$	$\frac{15}{128} = .1171875$
—	64ths	—	—	—
$\frac{1}{64} = .015625$	$\frac{17}{64} = .265625$	$\frac{33}{64} = .515625$	$\frac{49}{64} = .765625$	
$\frac{3}{64} = .046875$	$\frac{19}{64} = .296875$	$\frac{35}{64} = .546875$	$\frac{51}{64} = .796875$	
$\frac{5}{64} = .078125$	$\frac{21}{64} = .328125$	$\frac{37}{64} = .578125$	$\frac{53}{64} = .828125$	
$\frac{7}{64} = .109375$	$\frac{23}{64} = .359375$	$\frac{39}{64} = .609375$	$\frac{55}{64} = .859375$	
$\frac{9}{64} = .140625$	$\frac{25}{64} = .390625$	$\frac{41}{64} = .640625$	$\frac{57}{64} = .890625$	
$\frac{11}{64} = .171875$	$\frac{27}{64} = .421875$	$\frac{43}{64} = .671875$	$\frac{59}{64} = .921875$	
$\frac{13}{64} = .203125$	$\frac{29}{64} = .453125$	$\frac{45}{64} = .703125$	$\frac{61}{64} = .953125$	
$\frac{15}{64} = .234375$	$\frac{31}{64} = .484375$	$\frac{47}{64} = .734375$	$\frac{63}{64} = .984375$	

Table of Equivalents of Millimeters

in Decimals of Inches

$\frac{1}{10}$ mm. = .00394"	8 mm. = .31496"	18 mm. = .70866"
$\frac{1}{5}$ " = .00787"	9 " = .35433"	19 " = .74803"
$\frac{1}{2}$ " = .01969"	10 " = .39370"	20 " = .78740"
1 " = .03937"	11 " = .43307"	21 " = .82677"
2 " = .07874"	12 " = .47244"	22 " = .86614"
3 " = .11811"	13 " = .51181"	23 " = .90551"
4 " = .15748"	14 " = .55118"	24 " = .94488"
5 " = .19685"	15 " = .59055"	25 " = .98425"
6 " = .23622"	16 " = .62992"	26 " = 1.02362"
7 " = .27559"	17 " = .66929"	

Table of Metric Linear Measure

10 Millimeters = 1 Centimeter

1 Centimeter = .3937 Inch

10 Centimeters = 1 Decimeter

1 Decimeter = 3.937 Inches

10 Decimeters = 1 Meter

1 Meter = 39.37 Inches

1 Inch = 25.40 Millimeters

Straight Wheels

Rules for Calculating List Prices

DIAMETER—Wheels with diameters less than 1 inch take the list of a 1-inch wheel.

Wheels with diameters represented by odd inches or fractional parts of inches, intermediate to diameters shown in list, take the list of the next larger diameter.

Example: A wheel $5\frac{1}{2}$ " diameter takes the list of a 6" wheel, and a wheel $12\frac{1}{2}$ " diameter, or 13" diameter, takes the list of a 14" wheel.

THICKNESS—Wheels thinner than one-quarter of an inch take the list of a wheel one-quarter inch thick.

Wheels with thickness intermediate to those shown in list take the list of the next thicker wheel.

Example: A wheel $2\frac{5}{8}$ " thick takes the list of a $2\frac{3}{4}$ " wheel.

Wheels thicker than 4 inches are figured proportionately to the 4-inch thickness; thickness to increase from 4 inches by quarter inches, and intermediate fractional parts of inches to be figured at next higher quarter of an inch.

Example: To find the list price of a $30'' \times 7\frac{3}{8}$ " wheel, take the list of a $30'' \times 4''$, which is \$174.00, divide this by four and multiply by $7\frac{1}{2}$ ", which makes a list price of \$326.25.

HOLE—An allowance is made of one-third the list value of a wheel represented by the diameter of a hole 12 inches and larger. For holes less than 12 inches in diameter, or for countersinks of any size, no allowance is made.

Example: To find the price of a $24 \times 2 \times 14$ " wheel, take the list of a $24 \times 2''$, which is \$59.00, deduct from this one-third the price of a $14 \times 2''$, or one-third of \$21.20, which is \$7.05. \$7.05 deducted from \$59.00 gives the list price for a $24 \times 2 \times 14$ " wheel as \$51.95.

If the diameter of a hole is represented by odd inches or fractional parts of inches not shown in list, the next smaller diameter is taken as representing the diameter of a wheel for which allowance is made, the thickness of such a wheel to be the same as the wheel from list of which the deduction is made.

Example: To find the list of a $24 \times 2\frac{1}{8} \times 15\frac{3}{4}$ " wheel, take the list of a $24 \times 2\frac{1}{4}$ " wheel, or \$65.00. Take from this one-third the price of a $14 \times 2\frac{1}{4}$ " wheel, or one-third of \$23.50, which is \$7.85. \$7.85 deducted from \$65.00 gives the list price of a $24 \times 2\frac{1}{8} \times 15\frac{3}{4}$ " wheel as \$57.15.

Straight wheels with raised dovetails take the list of a straight wheel based on thickness at the face.

Taper-Side Wheels

Wheels tapered on both sides, either $\frac{1}{2}$ inch or $\frac{3}{4}$ inch to the foot, take the list prices of taper-side wheels shown on Pages 37 and 38.

For wheels with taper on one side only, either $\frac{1}{2}$ inch or $\frac{3}{4}$ inch to the foot, add one-half of the difference between the list price of straight wheels and taper-side wheels shown in taper-side price list.

Example: A 24×2 " wheel tapered one side only, $\frac{3}{4}$ " to the foot, takes a list price of one-half the difference between a 24×2 " straight wheel, \$59.00, and a 24×2 " taper-side wheel ($\frac{3}{4}$ " to the foot) \$74.00, or \$7.50 added to \$59.00, making \$66.50 list price.

A wheel with sides tapered less than $\frac{1}{2}$ inch per foot will take the list of a wheel with $\frac{1}{2}$ inch per foot tapered sides, while a wheel with sides tapered more than $\frac{1}{2}$ inch per foot will take the list of a wheel tapered $\frac{3}{4}$ inch per foot.

Price List—Straight Wheels

Subject to Discount

Diam. in Inches	THICKNESS OF WHEELS IN INCHES							
	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
1	\$.40	\$.50	\$.60	\$.70	\$.80	\$.95	\$1.05	\$1.15
2	.60	.75	.90	1.00	1.15	1.30	1.45	1.60
3	.80	1.00	1.20	1.45	1.65	1.85	2.10	2.30
4	1.10	1.40	1.65	1.95	2.25	2.55	2.80	3.10
5	1.50	1.90	2.25	2.65	3.00	3.40	3.80	4.15
6	1.90	2.40	2.90	3.40	3.90	4.45	4.95	5.40
7	2.30	2.95	3.60	4.30	4.95	5.60	6.30	6.90
8	2.70	3.55	4.40	5.20	6.10	6.90	7.80	8.60
9	3.10	4.15	5.20	6.30	7.40	8.40	9.50	10.60
10	3.60	4.90	6.20	7.50	8.90	10.20	11.50	12.80
12	4.20	6.00	7.80	9.50	11.30	13.10	14.90	16.70
14	4.90	7.20	9.60	11.90	14.20	16.50	18.90	21.20
16	5.70	8.70	11.60	14.60	17.60	20.50	23.50	26.50
18	6.60	10.30	14.00	17.70	21.40	25.10	28.80	32.50
20	....	12.30	16.80	21.40	25.90	30.50	35.00	39.60
22	....	....	20.10	25.60	31.10	36.70	42.20	47.70
24	....	....	24.00	30.60	37.30	44.00	51.00	59.00
26	....	....	....	36.40	44.50	52.50	61.00	69.00
28	....	....	....	....	46.00	55.00	65.00	74.00
30	....	....	....	....	58.00	68.00	79.00	89.00
32	72.00	84.00	96.00
34	82.00	95.00	109.00
36	94.00	109.00	124.00
38	136.00
40	151.00
42
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Price List—Straight Wheels

Subject to Discount

Diam. in Inches	THICKNESS OF WHEELS IN INCHES							
	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	3 $\frac{3}{4}$	4
1	\$1.25	\$1.35	\$1.45	\$1.55	\$1.70	\$1.80	\$1.90	\$2.00
2	1.75	1.85	2.00	2.15	2.30	2.40	2.55	2.70
3	2.50	2.70	2.95	3.15	3.35	3.55	3.80	4.00
4	3.40	3.70	4.00	4.25	4.55	4.80	5.10	5.40
5	4.55	4.90	5.30	5.70	6.05	6.40	6.80	7.20
6	5.95	6.50	7.00	7.50	8.00	8.50	9.00	9.50
7	7.55	8.20	8.90	9.60	10.25	10.90	11.55	12.20
8	9.45	10.30	11.15	12.00	12.85	13.70	14.55	15.40
9	11.65	12.70	13.75	14.80	15.90	17.00	18.05	19.10
10	14.10	15.40	16.70	18.00	19.35	20.70	22.00	23.30
12	18.45	20.20	22.00	23.80	25.55	27.30	29.10	30.90
14	23.50	25.80	28.15	30.50	32.80	35.10	37.45	39.80
16	29.45	32.40	35.35	38.30	41.30	44.30	47.25	50.20
18	36.15	39.80	43.50	47.20	50.90	54.60	58.30	62.00
20	44.15	48.70	53.35	58.00	62.50	67.00	71.50	76.00
22	53.35	59.00	64.50	70.00	75.50	81.00	86.50	92.00
24	65.00	71.00	78.00	85.00	92.00	99.00	106.00	113.00
26	77.00	85.00	93.00	101.00	109.00	117.00	125.00	133.00
28	83.00	92.00	102.00	111.00	120.00	129.00	139.00	148.00
30	100.00	111.00	122.00	132.00	143.00	153.00	164.00	174.00
32	109.00	121.00	133.00	145.00	157.00	169.00	181.00	193.00
34	123.00	136.00	150.00	163.00	177.00	191.00	204.00	218.00
36	139.00	154.00	169.00	183.00	198.00	213.00	228.00	243.00
38	153.00	170.00	187.00	204.00	221.00	238.00	255.00	272.00
40	170.00	189.00	207.00	226.00	245.00	264.00	283.00	302.00
42		209.00	229.00	249.00	270.00	290.00	311.00	331.00
44		228.00	251.00	274.00	297.00	319.00	342.00	365.00
46		249.00	274.00	299.00	324.00	349.00	374.00	399.00
48		271.00	299.00	326.00	353.00	380.00	407.00	434.00
50			353.00	383.00	412.00	442.00	471.00	
52				382.00	414.00	446.00	478.00	510.00
54				412.00	447.00	481.00	515.00	550.00
56				443.00	480.00	517.00	554.00	591.00
58				476.00	515.00	555.00	594.00	634.00
60				509.00	551.00	594.00	636.00	679.00

Price List—Straight Wheels

Subject to Discount

Diam. in Inches	THICKNESS OF WHEELS IN INCHES							
	4 $\frac{1}{4}$	4 $\frac{1}{2}$	4 $\frac{3}{4}$	5	5 $\frac{1}{4}$	5 $\frac{1}{2}$	5 $\frac{3}{4}$	6
12	\$32.85	\$34.75	\$36.70	\$38.65	\$40.55	\$42.50	\$44.40	\$46.35
14	42.30	44.80	47.25	49.75	52.25	54.75	57.20	59.70
16	53.35	56.50	59.60	62.75	65.90	69.05	72.15	75.30
18	65.90	69.75	73.65	77.50	81.40	85.25	89.15	93.00
20	80.75	85.50	90.25	95.00	99.75	104.50	109.25	114.00
—	—	—	—	—	—	—	—	—
22	97.75	103.50	109.25	115.00	120.75	126.50	132.25	138.00
24	120.05	127.15	134.20	141.25	148.30	155.40	162.45	169.50
26	141.30	149.65	157.95	166.25	174.55	182.90	191.20	199.50
28	157.25	166.50	175.75	185.00	194.25	203.50	212.75	222.00
30	184.90	195.75	206.65	217.50	228.40	239.25	250.15	261.00
—	—	—	—	—	—	—	—	—
32	205.05	217.15	229.20	241.25	253.30	265.40	277.45	289.50
34	231.65	245.25	258.90	272.50	286.15	299.75	313.40	327.00
36	258.20	273.40	288.55	303.75	318.95	334.15	349.30	364.50
38	289.00	306.00	323.00	340.00	357.00	374.00	391.00	408.00
40	320.90	339.75	358.65	377.50	396.40	415.25	434.15	453.00
—	—	—	—	—	—	—	—	—
42	351.70	372.40	393.05	413.75	434.45	455.15	475.80	496.50
44	387.80	410.65	433.45	456.25	479.05	501.90	524.70	547.50
46	423.95	448.90	473.80	498.75	523.70	548.65	573.55	598.50
48	461.15	488.25	515.40	542.50	569.65	596.75	623.90	651.00
50	500.45	529.90	559.30	588.75	618.20	647.65	677.05	706.50
—	—	—	—	—	—	—	—	—
52	541.90	573.75	605.65	637.50	669.40	701.25	733.15	765.00
54	584.40	618.75	653.15	687.50	721.90	756.25	790.65	825.00
56	627.95	664.90	701.80	738.75	775.70	812.65	849.55	886.50
58	673.65	713.25	752.90	792.50	832.15	871.75	911.40	951.00
60	721.45	763.90	806.30	848.75	891.20	933.65	976.05	1018.50

Price List—Straight Wheels

Subject to Discount

Diam. in Inches	THICKNESS OF WHEELS IN INCHES							
	6 $\frac{1}{4}$	6 $\frac{1}{2}$	6 $\frac{3}{4}$	7	7 $\frac{1}{4}$	7 $\frac{1}{2}$	7 $\frac{3}{4}$	8
12	\$48.30	\$50.20	\$52.15	\$54.10	\$56.00	\$57.95	\$59.85	\$61.80
14	62.20	64.70	67.15	69.65	72.15	74.65	77.10	79.60
16	78.45	81.60	84.70	87.85	91.00	94.15	97.25	100.40
18	96.90	100.75	104.65	108.50	112.40	116.25	120.15	124.00
20	118.75	123.50	128.25	133.00	137.75	142.50	147.25	152.00
22	143.75	149.50	155.25	161.00	166.75	172.50	178.25	184.00
24	176.55	183.65	190.70	197.75	204.80	211.90	218.95	226.00
26	207.80	216.15	224.45	232.75	241.05	249.40	257.70	266.00
28	231.25	240.50	249.75	259.00	268.25	277.50	286.75	296.00
30	271.90	282.75	293.65	304.50	315.40	326.25	337.15	348.00
32	301.55	313.65	325.70	337.75	349.80	361.90	373.95	386.00
34	340.65	354.25	367.90	381.50	395.15	408.75	422.40	436.00
36	379.70	394.90	410.05	425.25	440.45	455.65	470.80	486.00
38	425.00	442.00	459.00	476.00	493.00	510.00	527.00	544.00
40	471.90	490.75	509.65	528.50	547.40	566.25	585.15	604.00
42	517.20	537.90	558.55	579.25	599.95	620.65	641.30	662.00
44	570.30	593.15	615.95	638.75	661.55	684.40	707.20	730.00
46	623.45	648.40	673.30	698.25	723.20	748.15	773.05	798.00
48	678.15	705.25	732.40	759.50	786.65	813.75	840.90	868.00
50	735.95	765.40	794.80	824.25	853.70	883.15	912.55	942.00
52	796.90	828.75	860.65	892.50	924.40	956.25	988.15	1020.00
54	859.40	893.75	928.15	962.50	996.90	1031.25	1065.65	1100.00
56	923.45	960.40	997.30	1034.25	1071.20	1108.15	1145.05	1182.00
58	990.65	1030.25	1069.90	1109.50	1149.15	1188.75	1228.40	1268.00
60	1060.95	1103.40	1145.80	1188.25	1230.70	1273.15	1315.55	1358.00



Price List—Tapered Wheels

34-inch Taper, Two Sides

Subject to Discount

DIAMETER

THICKNESS OF WHEELS IN INCHES AND MILLIMETERS

In.	Mm.	In.- $1\frac{1}{4}$ Mm.-6	$1\frac{1}{2}$ 12	$\frac{3}{4}$ 19	1 25	$1\frac{1}{4}$ 32	$1\frac{1}{2}$ 38	$1\frac{3}{4}$ 45	2 50
10	250	\$5.10	\$6.40	\$7.70	\$9.00	\$10.40	\$11.70	\$13.00	\$14.30
12	305	6.20	8.00	9.80	11.50	13.30	15.10	16.90	18.70
14	355	7.90	10.20	12.60	14.90	17.20	19.50	21.90	24.20
16	405	10.20	13.20	16.10	19.10	22.10	25.00	28.00	31.00
18	460	12.60	16.30	20.00	23.70	27.40	31.10	34.80	38.50
20	510	.....	20.30	24.80	29.40	33.90	38.50	43.00	47.60
22	560	.....	.....	31.10	36.60	42.10	47.70	53.20	58.70
24	610	.....	.....	39.00	45.60	52.30	59.00	66.00	74.00
26	660	.....	.....	.....	56.40	64.50	72.50	81.00	89.00
28	710	.....	.....	.....	.....	71.00	80.00	90.00	99.00
30	760	.....	.....	.....	.....	89.00	99.00	110.00	120.00
32	810	.....	.....	.....	.....	.....	111.00	123.00	135.00
34	865	.....	.....	.....	.....	.....	130.00	143.00	157.00
36	915	.....	.....	.....	.....	.....	151.00	166.00	181.00
38	965	.....	.....	.....	.....	.....	.....	.....	204.00
40	1015	.....	.....	.....	.....	.....	.....	.....	231.00

DIAMETER

THICKNESS OF WHEELS IN INCHES AND MILLIMETERS

In.	Mm.	In.- $2\frac{1}{4}$ Mm.-56	$2\frac{1}{2}$ 63	$2\frac{3}{4}$ 70	$\frac{3}{4}$ 75	$3\frac{1}{4}$ 82	$3\frac{1}{2}$ 88	$3\frac{3}{4}$ 95	4 100
10	250	\$15.60	\$16.90	\$18.20	\$19.50	\$20.85	\$22.20	\$23.50	\$24.80
12	305	20.45	22.20	24.00	25.80	27.55	29.30	31.10	32.90
14	355	26.50	28.80	31.15	33.50	35.80	38.10	40.45	42.80
16	405	33.95	36.90	39.85	42.80	45.80	48.80	51.75	54.70
18	460	42.15	45.80	49.50	53.20	56.90	60.60	64.30	68.00
20	510	52.15	56.70	61.35	66.00	70.50	75.00	79.50	84.00
22	560	64.35	70.00	75.50	81.00	86.50	92.00	97.50	103.00
24	610	80.00	86.00	93.00	100.00	107.00	114.00	121.00	128.00
26	660	97.00	105.00	113.00	121.00	129.00	137.00	145.00	153.00
28	710	108.00	117.00	127.00	136.00	145.00	154.00	164.00	173.00
30	760	131.00	142.00	153.00	163.00	174.00	184.00	195.00	205.00
32	810	148.00	160.00	172.00	184.00	196.00	208.00	220.00	232.00
34	865	171.00	184.00	198.00	211.00	225.00	239.00	252.00	266.00
36	915	196.00	211.00	226.00	240.00	255.00	270.00	285.00	300.00
38	965	221.00	238.00	255.00	272.00	289.00	306.00	323.00	340.00
40	1015	250.00	269.00	287.00	306.00	325.00	344.00	363.00	382.00
42	1070	.....	301.00	321.00	341.00	362.00	382.00	403.00	423.00
44	1120	.....	336.00	359.00	382.00	405.00	427.00	450.00	473.00
46	1170	.....	374.00	399.00	424.00	449.00	474.00	499.00	524.00
48	1220	.....	413.00	441.00	468.00	495.00	522.00	549.00	576.00
50	1270	.....	.....	.....	515.00	545.00	574.00	604.00	633.00
52	1320	.....	.....	.....	566.00	598.00	630.00	662.00	694.00
54	1370	.....	.....	.....	619.00	654.00	688.00	722.00	757.00
56	1425	.....	.....	.....	674.00	711.00	748.00	785.00	822.00
58	1475	.....	.....	.....	733.00	772.00	812.00	851.00	891.00
60	1525	.....	.....	.....	796.00	838.00	881.00	923.00	966.00



Price List—Tapered Wheels

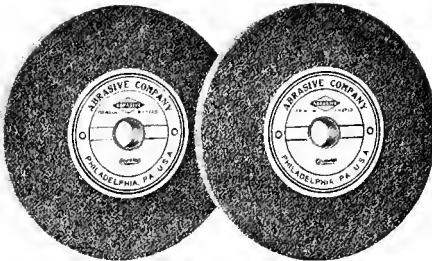
$\frac{1}{2}$ -inch Taper, Two Sides Subject to Discount

DIAMETER THICKNESS OF WHEELS IN INCHES AND MILLIMETERS

In.	Mm.	In. $-\frac{1}{4}$ Mm. $-\frac{6}{56}$	$\frac{1}{2}$ $-\frac{1}{2}$	$\frac{3}{4}$ $-\frac{19}{56}$	$\frac{1}{2}$ $-\frac{25}{56}$	$\frac{1\frac{1}{4}}{32}$	$\frac{1\frac{1}{2}}{38}$	$\frac{1\frac{3}{4}}{45}$	$\frac{2}{50}$
10	250	\$4.60	\$5.90	\$7.20	\$8.50	\$9.90	\$11.20	\$12.50	\$13.80
12	305	5.70	7.50	9.30	11.00	12.80	14.60	16.40	18.20
14	355	6.90	9.20	11.60	13.90	16.20	18.50	20.90	23.20
16	405	8.20	11.20	14.10	17.10	20.10	23.00	26.00	29.00
18	460	10.10	13.80	17.50	21.20	24.90	28.60	32.30	36.00
20	510	...	17.30	21.80	26.40	30.90	35.50	40.00	44.60
22	560	...	...	27.10	32.60	38.10	43.70	49.20	54.70
24	610	...	...	34.00	40.60	47.30	54.00	61.00	69.00
26	660	...	...	...	49.40	57.50	65.50	74.00	82.00
28	710	...	...	...	...	62.00	71.00	81.00	90.00
30	760	...	...	...	...	77.00	87.00	98.00	108.00
32	810	...	...	...	...	...	95.00	107.00	119.00
34	865	...	...	...	...	...	109.00	122.00	136.00
36	915	...	...	...	...	...	127.00	142.00	157.00
38	965	...	...	...	...	...	...	...	175.00
40	1015	...	...	...	...	...	...	...	197.00

DIAMETER THICKNESS OF WHEELS IN INCHES AND MILLIMETERS

In.	Mm.	In. $-\frac{1}{4}$ Mm. $-\frac{6}{56}$	$\frac{21}{63}$	$\frac{23}{70}$	$\frac{3}{75}$	$\frac{3\frac{1}{4}}{82}$	$\frac{3\frac{1}{2}}{88}$	$\frac{3\frac{3}{4}}{95}$	$\frac{4}{100}$
10	250	\$15.10	\$16.40	\$17.70	\$19.00	\$20.35	\$21.70	\$23.00	\$24.00
12	305	19.95	21.70	23.50	25.30	27.05	28.80	30.60	32.40
14	355	25.50	27.80	30.15	32.50	34.80	37.10	39.45	41.80
16	405	31.95	34.90	37.85	40.80	43.80	46.80	49.75	52.70
18	460	39.65	43.30	47.00	50.70	54.40	58.10	61.80	65.50
20	510	49.15	53.70	58.35	63.00	67.50	72.00	76.50	81.00
22	560	60.35	66.00	71.50	77.00	82.50	88.00	93.50	99.00
24	610	75.00	81.00	88.00	95.00	102.00	109.00	116.00	123.00
26	660	90.00	98.00	106.00	114.00	122.00	130.00	138.00	146.00
28	710	99.00	108.00	118.00	127.00	136.00	145.00	155.00	164.00
30	760	119.00	130.00	141.00	151.00	162.00	172.00	183.00	193.00
32	810	132.00	144.00	156.00	168.00	180.00	192.00	204.00	216.00
34	865	150.00	163.00	177.00	190.00	204.00	218.00	231.00	245.00
36	915	172.00	187.00	202.00	216.00	231.00	246.00	261.00	276.00
38	965	192.00	209.00	226.00	243.00	260.00	277.00	294.00	311.00
40	1015	216.00	235.00	253.00	272.00	291.00	310.00	329.00	348.00
42	1070	...	263.00	283.00	303.00	324.00	344.00	365.00	385.00
44	1120	...	293.00	316.00	339.00	362.00	384.00	407.00	430.00
46	1170	...	324.00	349.00	374.00	399.00	424.00	449.00	474.00
48	1220	...	356.00	384.00	411.00	438.00	463.00	492.00	519.00
50	1270	...	...	...	449.00	479.00	508.00	538.00	567.00
52	1320	...	...	...	490.00	522.00	554.00	586.00	618.00
54	1370	...	...	...	533.00	568.00	602.00	636.00	671.00
56	1425	...	...	...	579.00	616.00	653.00	690.00	727.00
58	1475	...	...	...	628.00	667.00	707.00	746.00	786.00
60	1525	...	...	...	679.00	721.00	764.00	806.00	849.00



Method of Calculating List Price of Rubber Wheels

Diameter

WHEELS with diameters less than 1 inch take the list of a 1 inch wheel.

Wheels with diameters represented by fractional parts of inches, intermediate to diameters shown on list, take the list of the next larger diameter.

Thickness

Wheels thinner than $\frac{1}{4}$ of an inch take the list of a wheel $\frac{1}{4}$ inch thick.

Wheels with thickness intermediate to those shown in list take the list of the next thicker wheel.

Wheels thicker than 4 inches are figured proportionately to the 4 inch thickness; thickness to increase from 4 inches by quarter inches, and intermediate fractional parts of inches to be figured at next higher $\frac{1}{4}$ of an inch.

Hole

An allowance is made of one-half the list price of a wheel represented by the diameter of the hole 6 inches and larger. For holes less than 6 inches in diameter, or for countersinks of any size, no allowance is made.

If the diameter of a hole is represented by odd inches, or fractional parts of inches not shown in list, the next smaller diameter is taken as representing the diameter of a wheel for which allowance is made, the thickness of such a wheel to be the same as the wheel from list of which the deduction is made.

In the case of a rubber wheel mounted on an iron center an allowance is made in the list price of the wheel (as above) for a hole the size of the iron center, lugs and dovetails not included.

The price of rubber cup wheels is figured in the same manner as vitrified cup wheels.

The price of rubber cylinder wheels is figured in the same manner as vitrified cylinder wheels.

Price List—Rubber Wheels

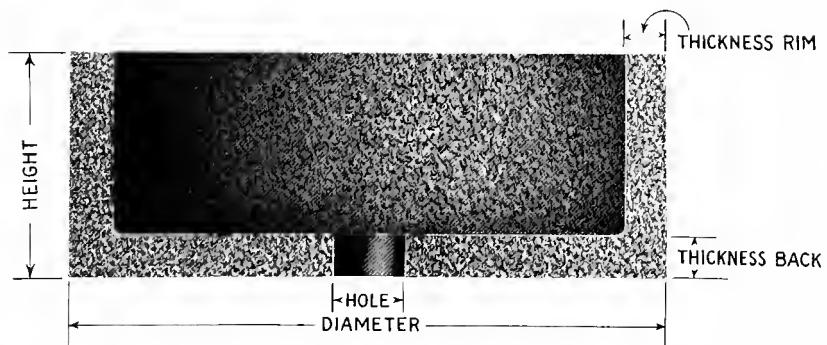
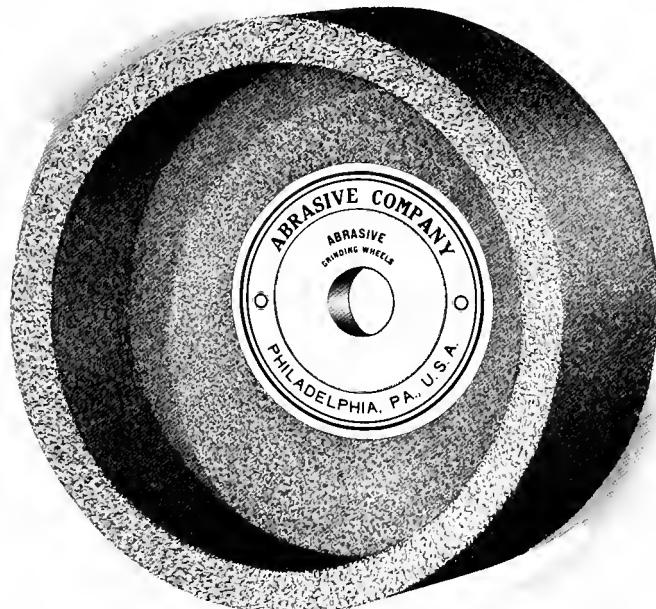
DIAMETER **THICKNESS OF WHEELS IN INCHES AND MILLIMETERS**

In.	Mm.	In.- ¹ ₄ Mm.-6	³ ₈ 10	¹ ₂ 12	⁵ ₈ 16	³ ₄ 19	⁷ ₈ 23	1 25	1 ¹ ₄ 32	1 ¹ ₂ 38	1 ³ ₄ 45
1	25	\$.40	\$.45	\$.50	\$.55	\$.60	\$.65	\$.70	\$.80	\$.95	\$1.05
1 ¹ ₂	38	.50	.60	.65	.75	.80	.85	.90	1.00	1.15	1.30
2	50	.60	.70	.75	.85	.90	.95	1.00	1.15	1.30	1.45
2 ¹ ₂	63	.70	.80	.90	1.00	1.10	1.20	1.30	1.50	1.70	1.90
3	75	.80	.90	1.00	1.10	1.20	1.35	1.45	1.65	1.85	2.10
3 ¹ ₂	88	.95	1.05	1.15	1.30	1.40	1.55	1.70	1.95	2.20	2.45
4	100	1.10	1.25	1.40	1.55	1.65	1.80	1.95	2.25	2.55	2.80
4 ¹ ₂	115	1.30	1.45	1.60	1.80	1.95	2.15	2.30	2.60	2.90	3.25
5	125	1.50	1.70	1.90	2.10	2.25	2.45	2.65	3.00	3.40	3.80
6	150	1.90	2.15	2.40	2.65	2.90	3.15	3.40	3.90	4.45	4.95
7	175	2.30	2.65	2.95	3.30	3.60	3.95	4.30	4.95	5.60	6.30
8	200	2.70	3.10	3.55	4.00	4.40	4.80	5.20	6.10	6.90	7.80
9	230	3.10	3.65	4.15	4.70	5.20	5.80	6.30	7.40	8.40	9.50
10	250	3.60	4.25	4.90	5.60	6.20	6.90	7.50	8.90	10.20	11.50
12	305	4.20	5.10	6.00	6.90	7.80	8.70	9.50	11.30	13.10	14.90
14	355	4.90	6.10	7.20	8.40	9.60	10.80	11.90	14.20	16.50	18.90
16	405	5.70	7.20	8.70	10.20	11.60	13.10	14.60	17.60	20.50	23.50
18	460	6.60	8.45	10.30	12.15	14.00	15.85	17.70	21.40	25.10	28.80
20	510	7.80	10.00	12.30	14.55	16.80	19.10	21.40	25.90	30.50	35.00
22	560	9.10	11.85	14.60	17.35	20.10	22.85	25.60	31.10	36.70	42.20
24	610	10.80	14.10	17.40	20.70	24.00	27.30	30.60	37.30	44.00	51.00

DIAMETER **THICKNESS OF WHEELS IN INCHES AND MILLIMETERS**

In.	Mm.	In.- ² Mm.-50	² ₃ 36	² ₁ ₂ 63	² ₃ ₄ 70	3 75	³ ₁ ₄ 82	³ ₁ ₂ 88	³ ₃ ₄ 95	4 100
1	25	\$1.15	\$1.25	\$1.35	\$1.45	\$1.55	\$1.70	\$1.80	\$1.90	\$2.00
1 ¹ ₂	38	1.40	1.50	1.60	1.75	1.85	2.00	2.10	2.25	2.35
2	50	1.60	1.75	1.85	2.00	2.15	2.30	2.40	2.55	2.70
2 ¹ ₂	63	2.10	2.15	2.30	2.50	2.65	2.85	3.00	3.20	3.35
3	75	2.30	2.50	2.70	2.95	3.15	3.35	3.55	3.80	4.00
3 ¹ ₂	88	2.70	2.95	3.20	3.50	3.70	3.95	4.20	4.45	4.70
4	100	3.10	3.40	3.70	4.00	4.25	4.55	4.80	5.10	5.40
4 ¹ ₂	115	3.60	4.00	4.30	4.65	5.00	5.30	5.60	5.95	6.30
5	125	4.15	4.55	4.90	5.30	5.70	6.05	6.40	6.80	7.20
6	150	5.40	5.95	6.50	7.00	7.50	8.00	8.50	9.00	9.50
7	175	6.90	7.55	8.20	8.90	9.60	10.25	10.90	11.55	12.20
8	200	8.60	9.45	10.30	11.15	12.00	12.85	13.70	14.55	15.40
9	230	10.60	11.65	12.70	13.75	14.80	15.90	17.00	18.05	19.10
10	250	12.80	14.10	15.40	16.70	18.00	19.35	20.70	22.00	23.30
12	305	16.70	18.45	20.20	22.00	23.80	25.55	27.30	29.10	30.90
14	355	21.20	23.50	25.80	28.15	30.50	32.80	35.10	37.45	39.80
16	405	26.50	29.45	32.40	35.35	38.30	41.30	44.30	47.25	50.20
18	460	32.50	36.15	39.80	43.50	47.20	50.90	54.60	58.30	62.00
20	510	39.60	44.15	48.70	53.35	58.00	62.50	67.00	71.50	76.00
22	560	47.70	53.35	59.00	64.50	70.00	75.50	81.00	86.50	92.00
24	610	59.00	65.00	71.00	78.00	85.00	92.00	99.00	106.00	113.00

Cup Wheels



Cup Wheels

Rules for Calculating List Prices

The cup wheel price list is based on cups with the same back and rim thickness.

A wheel 8 inches or more outside diameter, 4 inches or more in height, with an inside cup diameter of not less than 6 inches, and a rim thickness not exceeding 4 inches is figured as a cup wheel. Cups with outside projections, or tapered rims, take the list of the maximum diameter and maximum thickness of rim.

Example: A cup 24" diameter at top, 7" high, with a rim 3" thick at the top and having an outside projection of $\frac{3}{8}$ " at the bottom, lists as a 26 x 7 x $3\frac{1}{2}$ " cup wheel at \$186.60.

Example: A taper cup 14 $12\frac{1}{2}$ " diameter, 7" in height, with rim tapering $1\frac{1}{2}$ " at top to $2\frac{1}{2}$ " at the bottom, takes list of a cup 14 x 7 x $2\frac{1}{2}$ " rim and back, \$58.05.

Cup wheels with diameters intermediate to those shown in list take the list of the next larger diameter.

Cup wheels with heights intermediate to those shown in list take the list of the next higher cup.

Example: Cup $6\frac{1}{4}$ " high lists as 7".

Cup wheels with rim thickness intermediate to those shown in list take the list of the next thicker rim.

Example: 1 $\frac{1}{4}$ " rim takes list of 1 $\frac{1}{2}$ " rim.

Cup wheels more than 8 inches in height are figured proportionately to the 8-inch height for any listed diameter.

Heights of cups increase by 1 inch from 8 inches, and intermediate heights take the list of the next higher inch.

Example: A cup 28" diameter, 8" high, with 3" rim, lists at \$240.95. A cup of same diameter and rim thickness, but 9" high, would take an additional list of $\frac{1}{8}$ of \$240.95 or \$30.10, making a total list for the cup 28" diameter, 9" high, 3" rim of \$271.05.

BACKS—A price per inch or fractional part of an inch is shown in list following “Back per Inch,” for figuring the list price of a cup wheel with back and rim of different thickness.

Cup wheels with backs varying in thickness from that of their rims to the extent of fractional parts of inches take the list of the next higher inch in thickness.

Example: The list of an 8" cup wheel, 4" high, with 1" rim and 1" back, is \$16.20. Price per inch for backs of greater or less thickness is \$.65. If a 1½" or 2" back is desired, add \$.65 to the list price for a wheel with 1", making list \$16.85.

Example: The list of a 16" cup wheel, 7" high, with 2½" rim, and 2½" back is \$74.05. Price per inch for backs of greater or less thickness is \$2.25. If a 1" or 1½" back is desired, deduct \$2.25 from the list price for wheels with 2½" back, making list \$71.80.

For cup wheels more than 8 inches in height, with thickness of the back varying from that of rim, calculate first the list for height and then make proper additions or deductions for back.

Example: A cup 14" diameter, 9" high, 2" rim, 3" back. The list price of the cup 8" high and 2" back is \$63.60. Add one-eighth or \$7.95, which amounts to \$71.55, plus \$1.85 for the extra thickness of back, which makes the price \$73.40. If the back were 1" thick, \$1.85 would be deducted from \$71.55. If the back were between 1" and 2" thickness, no allowance would be made.

The back of a cup wheel is represented by any projection inside the cup, whether it is in the form of a small shoulder, raised dovetail or complete back.

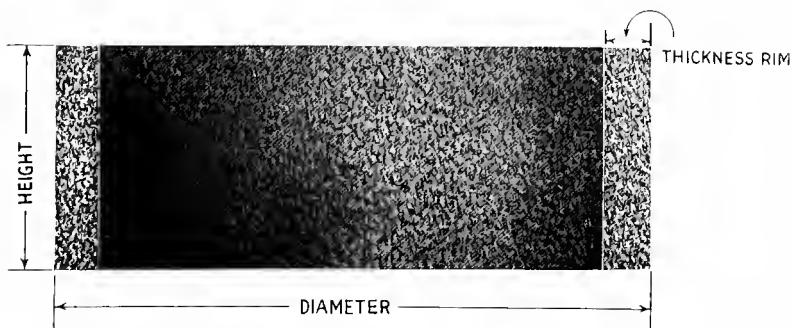
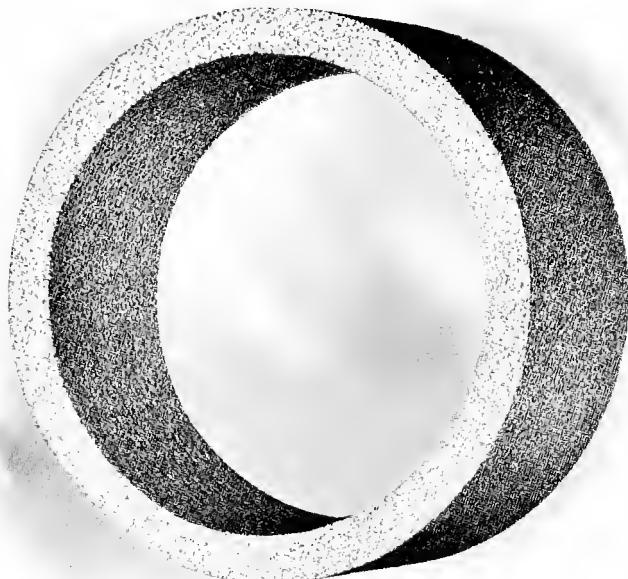
For backs less than 1 inch deductions from list down to 1 inch only are allowed, and made only in full inches.

No allowance is made for holes in backs of cup wheels, regardless of diameter.

Price List—Cup Wheels Subject to Discount

Diameter in Inches	Height in Inches	THICKNESS OF RIM AND BACK IN INCHES						
		1	1½	2	2½	3	3½	4
8	4	\$16.20	.....	.....	.....	.....	.....	.....
	5	18.90	.....	.....	.....	.....	.....	.....
	6	21.45	.....	.....	.....	.....	.....	.....
	7	23.85	.....	.....	.....	.....	.....	.....
	8	27.25	.....	.....	.....	.....	.....	.....
	Back per inch	.65	.....	.....	.....	.....	.....	.....
	4	21.00	\$22.20	\$23.20	.....	.....	.....	.....
	5	24.70	26.20	27.40	.....	.....	.....	.....
10	6	27.75	29.55	30.70	.....	.....	.....	.....
	7	31.45	33.45	35.20	.....	.....	.....	.....
	8	35.95	38.25	40.25	.....	.....	.....	.....
	Back per inch	1.20	.90	.65	.....	.....	.....	.....
	4	25.50	27.30	28.65	\$29.70	\$30.25	.....	.....
	5	29.50	31.60	33.30	34.60	35.35	.....	.....
	6	33.45	35.85	37.90	39.45	40.45	.....	.....
	7	38.05	40.80	42.90	44.95	46.20	.....	.....
12	8	43.50	46.65	49.00	51.35	52.80	.....	.....
	Back per inch	1.85	1.50	1.20	.90	.65	.....	.....
	4	31.80	34.20	36.10	37.50	38.55	\$39.25	\$39.60
	5	37.45	40.20	42.45	44.20	45.60	46.50	47.10
	6	42.60	45.90	48.55	50.55	52.35	53.50	54.30
	7	49.00	52.60	55.65	58.05	60.00	61.50	62.65
	8	56.00	60.10	63.60	66.35	68.55	70.30	71.60
	Back per inch	2.70	2.25	1.85	1.50	1.20	.90	.65
14	4	39.75	42.85	45.30	47.25	48.30	49.80	50.50
	5	47.55	51.25	54.15	56.55	57.90	59.80	60.85
	6	55.00	59.05	62.40	65.25	66.85	69.25	70.60
	7	62.35	66.85	70.65	74.05	75.85	78.70	80.35
	8	71.25	76.40	80.75	84.60	86.70	89.95	91.80
	Back per inch	3.65	3.15	2.70	2.25	1.85	1.50	1.20
	4	51.40	55.15	58.30	60.85	62.80	64.05	65.40
	5	60.25	64.60	68.25	71.35	73.75	75.40	77.10
16	6	68.85	73.50	78.00	81.55	84.40	86.50	88.65
	7	77.70	82.30	87.90	91.95	95.20	97.80	100.30
	8	88.80	95.10	100.45	105.10	108.80	111.75	114.60
	Back per inch	4.75	4.20	3.65	3.15	2.70	2.25	1.85
	4	61.60	66.40	69.75	73.30	76.05	77.95	79.50
	5	71.65	77.05	81.10	85.15	88.55	90.75	92.85
	6	81.70	87.70	92.35	97.00	100.90	103.65	106.20
	7	92.25	98.95	104.20	109.35	113.85	117.10	120.10
18	8	105.40	113.10	119.10	124.95	130.10	133.85	137.25
	Back per inch	6.05	5.40	4.75	4.20	3.65	3.15	2.70
	4	84.10	90.55	96.15	100.95	105.00	108.30	111.00
	5	99.40	106.65	113.10	118.50	123.30	127.30	130.50
	6	113.65	121.65	128.85	135.00	140.50	145.05	148.95
	7	128.85	137.65	145.75	152.50	158.65	163.90	168.30
	8	147.25	157.30	166.55	174.30	181.30	187.30	192.35
	Back per inch	9.05	8.25	7.45	6.75	6.05	5.40	4.75
20	4	126.00	136.15	145.00	153.60	160.90	166.30	172.05
	5	150.15	161.35	171.25	180.70	188.80	195.15	201.75
	6	170.50	182.65	193.60	203.95	212.95	220.15	227.70
	7	193.35	206.50	218.50	229.65	239.55	247.65	256.05
	8	220.95	236.00	249.70	262.45	273.75	283.00	292.60
	Back per inch	14.55	13.60	12.45	11.80	10.95	9.90	9.15

Cylinders



Cylinder Wheels

Rules for Calculating List Prices

A wheel 8 inches or more outside diameter, 4 inches or more in height, with a hole not less than 6 inches in diameter, rim thickness not exceeding 4 inches and without inside projections, is figured as a cylinder.

A wheel of this type with inside projections is a cup wheel.

A cylinder with outside projections or with tapered rims takes the list price of the maximum diameter and the maximum thickness of rim.

Example: A taper cylinder 12" 10" diameter, 6" in height, with a rim taper 1" at top to 1 $\frac{1}{2}$ " at bottom, takes a list of 12 x 6 x 1 $\frac{1}{2}$ " wheel, \$32.10.

Example: A cylinder 16" in diameter at top, 5" high, with a rim 2" thick at the top, and with an outside projection at the bottom of one-half an inch, lists as an 18 x 5 x 2 $\frac{1}{2}$ " rim, or \$59.70.

Cylinder wheels with diameters intermediate to those shown on list take the list of the next larger diameter.

Example: A cylinder 11" diameter takes the list price of a 12".

Cylinders with heights intermediate to those shown in list take the list of the next higher cylinder.

Example: A cylinder 5 $\frac{1}{4}$ " in height takes 6" list.

Cylinder wheels with rim thicknesses intermediate to those shown in list take the list of the next thicker rim.

Example: A cylinder with 1 $\frac{1}{4}$ " rim takes the list price of a 1 $\frac{1}{2}$ " rim.

Cylinders more than 8 inches in height are figured proportionately to the 8-inch height for any listed diameter. Heights of cylinders increase by 1 inch from 8 inches, and intermediate heights take the price of the next higher inch.

Example: A cylinder 26" in diameter, 8" in height, with 2" rim, lists as \$166.95. A cylinder of the same diameter with rim height 9" would take an additional list of one-eighth of \$166.95 or \$20.85, making total list for cylinder 26 x 9 x 2" rim, \$187.80.

Price List—Cylinders Subject to Discount

Diameter in Inches	Height in Inches	THICKNESS OF RIM IN INCHES						
		1	1½	2	2½	3	3½	4
8	4	\$13.75	.....	.....	.....	.....	.....	.....
	5	17.35	.....	.....	.....	.....	.....	.....
	6	19.75	.....	.....	.....	.....	.....	.....
	7	22.30	.....	.....	.....	.....	.....	.....
	8	25.50	.....	.....	.....	.....	.....	.....
	4	16.30	\$17.20	.....	.....	.....	.....	.....
	5	19.80	20.95	.....	.....	.....	.....	.....
	6	22.45	23.85	.....	.....	.....	.....	.....
9	7	25.60	27.15	.....	.....	.....	.....	.....
	8	29.25	31.00	.....	.....	.....	.....	.....
	4	18.90	20.05	\$21.10	.....	.....	.....	.....
	5	22.50	23.95	25.20	.....	.....	.....	.....
	6	25.60	27.30	28.50	.....	.....	.....	.....
	7	29.35	31.20	33.00	.....	.....	.....	.....
	8	33.55	35.65	37.70	.....	.....	.....	.....
	4	22.20	23.70	25.00	\$26.20	\$27.10	.....	.....
10	5	26.20	28.00	29.65	31.05	32.20	.....	.....
	6	30.00	32.10	34.05	35.80	37.15	.....	.....
	7	34.35	36.85	38.85	41.05	42.70	.....	.....
	8	39.25	42.10	44.40	46.90	48.80	.....	.....
	4	27.30	29.05	30.70	32.20	33.45	\$34.60	\$35.55
	5	32.85	35.05	37.05	38.85	40.50	41.85	43.05
	6	37.75	40.35	42.75	44.85	46.90	48.45	49.90
	7	43.80	46.80	49.65	52.15	54.30	56.25	58.00
12	8	50.05	53.50	56.75	59.60	62.05	64.30	66.30
	4	34.20	36.30	38.25	40.05	41.25	43.15	44.40
	5	41.10	43.80	46.20	48.45	49.95	52.20	53.85
	6	48.55	51.60	54.45	57.15	58.90	61.65	63.60
	7	55.35	58.90	62.20	65.40	67.35	70.60	72.85
	8	63.25	67.30	71.10	74.75	76.95	80.70	83.25
	4	42.70	45.00	47.25	49.35	51.30	52.80	54.70
	5	51.40	54.30	57.10	59.70	62.10	64.00	66.25
14	6	59.10	62.35	65.95	69.00	71.85	74.20	76.90
	7	67.75	71.85	75.70	79.30	82.50	85.35	88.35
	8	77.40	82.10	86.50	90.60	94.30	97.55	100.95
	4	51.15	53.85	56.10	58.80	61.20	63.15	65.20
	5	61.20	64.60	67.50	70.75	73.75	76.05	78.60
	6	70.60	74.55	78.10	81.90	85.45	88.30	91.30
	7	80.95	85.50	89.65	94.00	98.10	101.40	104.85
	8	92.50	97.70	102.45	107.40	112.10	115.90	119.80
20	4	70.30	73.65	76.90	79.95	82.90	85.60	88.20
	5	86.55	90.70	94.75	98.40	102.10	105.45	108.60
	6	100.45	105.40	110.20	114.60	118.95	122.95	126.75
	7	115.05	120.75	126.45	131.50	136.50	141.15	145.50
	8	131.50	138.00	144.50	150.30	156.00	161.30	166.30
	4	104.20	108.45	112.65	116.80	120.60	124.05	127.90
	5	128.50	133.80	139.05	144.00	148.65	153.10	157.75
	6	148.90	155.20	161.50	167.35	172.90	178.15	183.75
30	7	172.00	179.25	186.60	193.30	199.75	205.90	212.35
	8	196.55	204.85	213.25	220.90	228.30	235.30	242.70

Special Shaped Wheels

THE different makes of special grinding machines require special shaped grinding wheels which are classified and illustrated on the following pages. Index to these will be found on Pages 124 and 125. Practically all of the different special shapes shown are modifications of straight wheels, cups, cylinders or saucers and the list prices are figured according to the respective class.

In addition to the various sizes and shapes shown, we are prepared to furnish grinding wheels of almost any size or shape from 48 inches diameter to 10 inches thick for any make of grinding machine.

Inquiries for price of special wheels not shown should be accompanied by sketch showing shape and dimensions required, and include full information regarding type of machine, kind of material to be ground, amount of stock to be removed, finish desired, speed of wheel spindle, and speed of work.

"Abrasive" Wheels are furnished in two kinds of abrasive materials—Borolon or Electrolon. Each is made in many different combinations of grain and grade, selected to suit the particular conditions under which it is to be used.

Wheels for Norton Plain Grinding Machines

MACHINE	D			CODE	LIST PRICE
	D	T	H		
6 Inch	14	2	5	Nordland	\$21.20
6 "	14	1	5	Nordpol	11.90
10 "	18	2	5	Nordwest	32.50
10 "	18	1	5	Norther	17.70
14 "	20	2	5	Nosegay	39.60
18 "	24	2	5	Nostril	59.00
18 " Gap	24	1	5	Novelty	30.60
Surface Grinder 15 x 15 inches	14	3	5	Noward	30.50

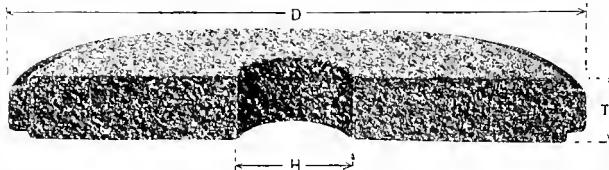
MACHINE	D			CODE	LIST PRICE
	D	T	H		
18-Inch Gap	24	3 $\frac{1}{8}$	5	Nourished	113.00

MACHINE	D			CODE	LIST PRICE
	D	T	H		
44-Inch Steam Car Wheel Grinder	24	2 $\frac{3}{4}$	5	Noxious	78.00

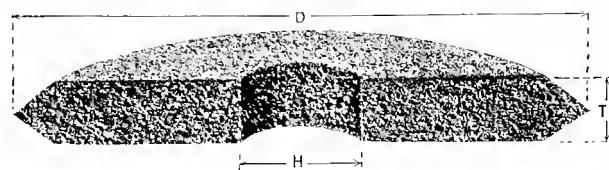
Wheels for Norton Surface Grinding Machines

MACHINE	D			CODE	LIST PRICE
	D	T	H		
Surface Grinder 15 x 15 Inches	14	4	5	8 Northeast	39.80
" " 15 x 15 Inches	14	5	5	8 Nodding	49.75
" " 15 x 15 Inches	14	6	5	8 Nudge	59.70

Wheels for Norton Plain Grinding Machines

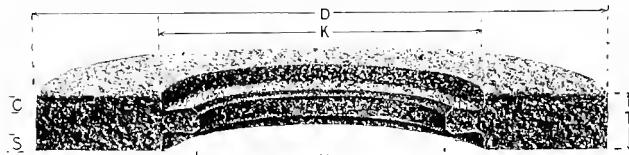


MACHINE D T H CODE LIST PRICE
44-Inch Street Car Wheel Grinder 24 $2\frac{3}{4}$ 5 Nugget \$78.00



44-Inch Street Car Wheel Grinder 24 $2\frac{3}{4}$ 5 Nozzle 78.00

Wheels for Norton Crankshaft Grinding Machines



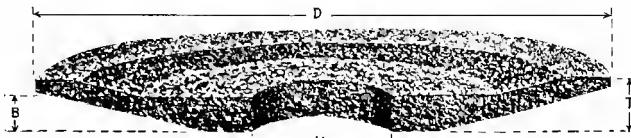
SHAPE	D	T	H	C	S	K		
Norton 60	20	2	12	$\frac{1}{2}$	$\frac{1}{2}$	$14\frac{5}{8}$	Numerical	34.05
" 61	20	$2\frac{1}{8}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Numerist	38.00
" 62	20	$2\frac{1}{4}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Numerique	38.00
" 63	20	$2\frac{3}{8}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Numskull	41.95
" 64	20	$2\frac{3}{4}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Nunchion	41.95
" 65	20	$2\frac{5}{8}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Nunciate	46.00
" 66	20	$2\frac{1}{2}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Nuncio	46.00
" 67	20	$2\frac{5}{8}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Nuncupate	50.05
" 68	20	3	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Nundinary	50.05
" 69	20	$3\frac{1}{8}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Nunnery	54.00
" 70	20	$3\frac{1}{4}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Nuptial	54.00
" 71	20	$3\frac{1}{3}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Nurse	57.90
" 72	20	$3\frac{1}{3}\frac{1}{2}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Nursery	61.80
" 73	24	2	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Notedly	53.45
" 74	24	$2\frac{1}{8}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Notarius	58.85
" 75	24	$2\frac{1}{4}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Notation	58.85
" 76	24	$2\frac{3}{8}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Notched	64.25
" 77	24	$2\frac{3}{4}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Notching	64.25
" 78	24	$2\frac{5}{8}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Notebook	70.65
" 79	24	$2\frac{4}{5}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Notedness	70.65
" 80	24	$2\frac{7}{8}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Noteworthy	77.05
" 81	24	3	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Noticeable	77.05
" 82	24	$3\frac{1}{8}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Notifier	83.50
" 83	24	$3\frac{1}{4}$	12	$\frac{1}{2}$	$\frac{3}{2}$	$14\frac{5}{8}$	Notionist	83.50

Wheels for Norton Crankshaft Grinding Machines

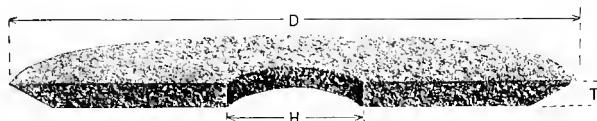
(Continued)

SHAPE	D	T	H	C	S	K	CODE	LIST PRICE
Norton	84 24	3 ¹ ₂	12	1 ⁷ ₃₂	1 ²¹ ₃₂	14 ⁵ ₈	Notoriety	\$89.90
"	85 24	3 ¹ ₂	12	1 ⁷ ₃₂	1 ²⁵ ₃₂	14 ⁵ ₈	Notorious	96.30
"	86 26	2 ¹ ₂	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nouement	76.40
"	87 26	2 ⁵ ₈	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nourish	83.60
"	88 26	2 ³ ₄	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nourishing	83.60
"	89 26	2 ⁷ ₈	15	1 ¹ ₆	1 ¹ ₃	17 ¹ ₂	Nourrisson	90.85
"	90 26	3	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nourriture	90.85
"	91 26	3 ¹ ₈	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nouveaute	98.05
"	92 26	3 ¹ ₄	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Novacuite	98.05
"	93 26	3 ³ ₈	15	1 ¹ ₆	1 ⁵ ₆	17 ¹ ₂	Novice	105.30
"	94 26	3 ¹ ₂	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Novelador	105.30
"	95 26	3 ⁵ ₈	15	1 ¹ ₆	1 ⁹ ₁₆	17 ¹ ₂	Nustle	112.50
"	96 26	3 ³ ₈	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nutation	112.50
"	97 26	3 ⁷ ₈	15	1 ¹ ₆	1 ¹ ₃	17 ¹ ₂	Nutbrown	119.75
"	98 26	4	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nutcracker	119.75
"	99 28	2 ³ ₄	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nutgall	92.60
"	100 28	2 ⁷ ₈	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nuthatch	100.85
"	101 28	3	15	1 ¹ ₆	1 ¹ ₃	17 ¹ ₂	Nutmeg	100.85
"	102 28	3 ¹ ₈	15	1 ¹ ₆	1 ¹ ₅	17 ¹ ₂	Nutpecker	109.05
"	103 28	3 ¹ ₄	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nutrient	109.05
"	104 28	3 ³ ₈	15	1 ¹ ₆	1 ³ ₁₆	17 ¹ ₂	Nutrical	117.30
"	105 28	3 ¹ ₂	15	1 ¹ ₆	1 ⁹ ₁₆	17 ¹ ₂	Nutriments	117.30
"	106 28	3 ⁵ ₈	15	1 ¹ ₆	1 ⁷ ₁₆	17 ¹ ₂	Nutshell	126.50
"	107 28	3 ³ ₄	15	1 ¹ ₆	1 ⁹ ₁₆	17 ¹ ₂	Nutting	126.50
"	108 28	3 ⁷ ₈	15	1 ¹ ₆	1 ¹ ₆	17 ¹ ₂	Nymphlike	134.75
"	109 28	4	15	1 ¹ ₆	1 ¹ ₃	17 ¹ ₂	Nursling	134.75
"	110 30	3 ¹ ₂	20	1 ¹ ₆	1 ⁵ ₈	22 ¹ ₂	Nimbleness	122.15
"	111 30	3 ³ ₈	20	1 ¹ ₆	1 ¹¹ ₁₆	22 ¹ ₂	Nimety	130.65
"	112 30	3 ¹ ₄	20	1 ¹ ₆	1 ⁷ ₈	22 ¹ ₂	Ninada	130.65
"	113 30	3 ⁵ ₈	20	1 ¹ ₆	1 ¹⁵ ₁₆	22 ¹ ₂	Ninepins	140.15
"	114 30	3 ³ ₄	20	1 ¹ ₆	1 ¹ ₈	22 ¹ ₂	Nigira	140.15
"	115 30	3 ⁷ ₈	20	1 ¹ ₆	1 ¹ ₈	22 ¹ ₂	Ninny	148.65
"	116 30	4	20	1 ¹ ₆	1 ¹ ₈	22 ¹ ₂	Nipper	148.65
"	117 30	4 ¹ ₈	20	1 ¹ ₆	1 ¹ ₈	22 ¹ ₂	Nippingly	157.95
"	118 30	4 ¹ ₄	20	1 ¹ ₆	1 ¹ ₈	22 ¹ ₂	Nitouche	157.95
"	119 30	4 ⁵ ₈	20	1 ¹ ₆	1 ¹ ₈	22 ¹ ₂	Nitrify	167.25
"	120 30	4 ¹ ₂	20	1 ¹ ₆	1 ¹ ₈	22 ¹ ₂	Nigidie	167.25
"	121 30	4 ⁵ ₈	20	1 ¹ ₆	1 ¹ ₈	22 ¹ ₂	Nitrous	176.55
"	122 30	4 ³ ₄	20	1 ¹ ₆	1 ¹ ₈	22 ¹ ₂	Nivelar	176.55
"	123 30	4 ⁷ ₈	20	1 ¹ ₆	1 ¹ ₈	22 ¹ ₂	Nobleness	185.85
"	124 30	5	20	1 ³ ₁₆	1 ¹ ₈	22 ¹ ₂	Nobody	185.85

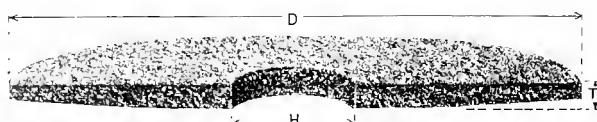
Wheels for Norton Universal T. and C. Grinding Machines



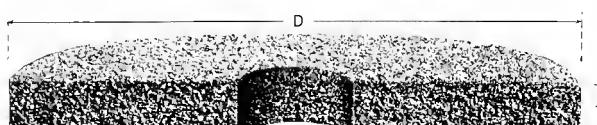
MACHINE	SHAPE	D	T	H	B	CODE	LIST PRICE
No. 1 and 2	Norton 1	3	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{2}{3}$	Cabinied	\$1.00
No. 1	Norton 2	$3\frac{1}{2}$	$\frac{15}{16}$	$\frac{1}{2}$	$\frac{1}{4}$	Cabiride	1.40
No. 1 and 2	Norton 3	$4\frac{1}{2}$	$\frac{15}{16}$	$\frac{1}{2}$	$\frac{1}{4}$	Cabman	1.90
No. 1	Norton 10, coarse	6	$\frac{1}{2}$	$1\frac{1}{4}$	$\frac{1}{3}$	Cadamba	2.90
No. 1	Norton 30, fine	6	$\frac{1}{2}$	$1\frac{1}{4}$	$\frac{3}{8}$	Calparum	2.90
No. 2	Norton 43, coarse	6	$\frac{1}{2}$	$1\frac{1}{2}$	$\frac{3}{8}$	Kopfloser	2.90
No. 2	Norton 52, fine	6	$\frac{11}{16}$	$1\frac{1}{2}$	$\frac{3}{8}$	Koralle	2.90



No. 1	Norton 8	D 5	T $\frac{1}{4}$	H $1\frac{1}{4}$	Cabolo	1.50
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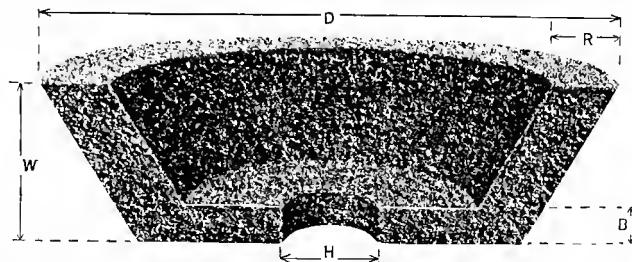


No. 1	Norton 11	D $5\frac{1}{2}$	T $\frac{5}{16}$	H $1\frac{1}{4}$	Cadenero	2.40
No. 1	Norton 17	D $5\frac{1}{2}$	T $\frac{5}{16}$	H $1\frac{1}{4}$	Calachon	2.40
No. 1	Norton 21, coarse	D 7	T $\frac{1}{2}$	H $1\frac{1}{4}$	Caladion	2.95
No. 1	Norton 32, fine	D 7	T $\frac{1}{2}$	H $1\frac{1}{4}$	Calpurne	2.95
No. 2	Norton 44	D 6	T $\frac{5}{16}$	H $1\frac{1}{2}$	Kopfrose	2.40
No. 2	Norton 48	D 6	T $\frac{5}{16}$	H $1\frac{1}{2}$	Kopsters	2.40
No. 2	Norton 53, fine	D 8	T $\frac{1}{2}$	H $1\frac{1}{2}$	Koranda	3.55

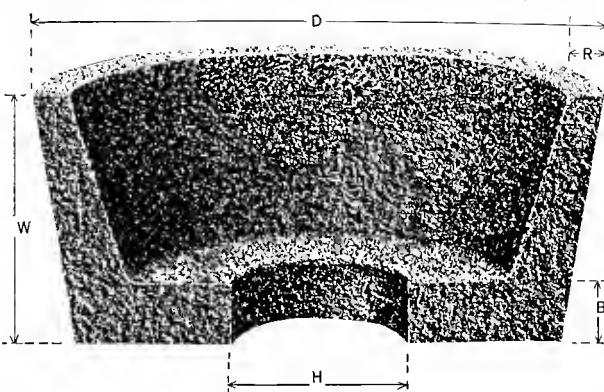


No. 1	Norton 14, coarse	D 6	T $\frac{1}{2}$	H $1\frac{1}{4}$	Cadaste	2.40
No. 1	Norton 31, fine	D 6	T $\frac{1}{2}$	H $1\frac{1}{4}$	Calpesto	2.40
No. 2	Norton 46, coarse	D 8	T $\frac{5}{16}$	H $1\frac{1}{2}$	Kopftuch	3.55
No. 2	Norton 49	D 8	T $\frac{5}{16}$	H $1\frac{1}{2}$	Kopstuk	3.55

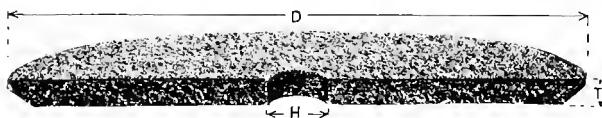
Wheels for Norton Universal T. and C. Grinding Machines



MACHINE	SHAPE	D	W	H	R	B	CODE	LIST PRICE
No. 1	Norton 15	7	2	1 $\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	Calabrone	\$6.90
No. 2	Norton 47	7	2	1 $\frac{1}{2}$	$\frac{4}{3}$	$\frac{1}{2}$	Koppiger	6.90



		D	W	H	R	B		
No. 1	Norton 28, coarse	4	1 $\frac{3}{8}$	1 $\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	Caloyer	2.55
No. 1	Norton 29, fine	4	1 $\frac{3}{8}$	1 $\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	Calparis	2.55
No. 2	Norton 50, coarse	4 $\frac{1}{2}$	2	1 $\frac{1}{2}$	$\frac{5}{16}$	$\frac{1}{2}$	Kopten	4.15
No. 2	Norton 51, fine	4 $\frac{1}{2}$	2	1 $\frac{1}{2}$	$\frac{5}{16}$	$\frac{1}{2}$	Korahite	4.15

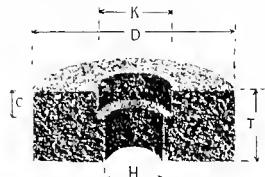


		D	T	H		
No. 2	Norton 42	5	$\frac{1}{4}$	1 $\frac{1}{2}$	Kopflos	1.50



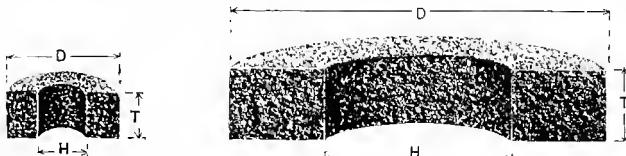
		D	T	H		
No. 1	Norton 12	7	$\frac{1}{16}$	1 $\frac{1}{4}$	Cadarzo	2.30
No. 2	Norton 45	7	$\frac{1}{16}$	1 $\frac{1}{2}$	Kopfton	2.30

Wheels for Norton Universal T. and C. Grinding Machines



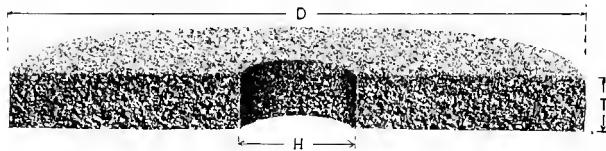
MACHINE	SHAPE	D	T	H	K	C	CODE	LIST PRICE
No. 1	Norton 22	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Calcinar	.40
No. 1	Norton 23	$\frac{7}{16}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Calende	.40
No. 1	Norton 24	$\frac{9}{16}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Calendule	.40
No. 1	Norton 25	$\frac{11}{16}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Calepin	.40
No. 1	Norton 26	$\frac{13}{16}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Callicles	.40
No. 1	Norton 27	$\frac{15}{16}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Callidice	.40
No. 2	Norton 33	$\frac{11}{16}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Calque	.50
No. 2	Norton 34	$\frac{13}{16}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Campatois	.50
No. 2	Norton 35	$\frac{15}{16}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Campeche	.50
No. 2	Norton 36	$1\frac{1}{16}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Campensia	.75
No. 2	Norton 37	$1\frac{3}{16}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Campeones	.75
No. 2	Norton 38	$1\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Camperout	.75
No. 2	Norton 39	$1\frac{7}{16}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{32}$	Campesino	.75
No. 2	Norton 54	$\frac{7}{8}$	$\frac{3}{8}$	$\frac{4}{16}$	$\frac{1}{4}$	$\frac{5}{32}$	Korbwelle	.50
No. 2	Norton 55	1	$\frac{5}{8}$	$\frac{16}{16}$	$\frac{1}{4}$	$\frac{5}{32}$	Corduan	.50
No. 2	Norton 56	$1\frac{1}{16}$	$\frac{5}{8}$	$\frac{16}{16}$	$\frac{1}{4}$	$\frac{5}{32}$	Korengras	.75
No. 2	Norton 57	$1\frac{3}{16}$	$\frac{5}{8}$	$\frac{16}{16}$	$\frac{1}{4}$	$\frac{5}{32}$	Koremot	.75
No. 2	Norton 58	$1\frac{5}{16}$	$\frac{5}{8}$	$\frac{16}{16}$	$\frac{1}{4}$	$\frac{5}{32}$	Korenwan	.75
No. 2	Norton 59	2	$\frac{5}{8}$	$\frac{5}{16}$	$\frac{1}{4}$	$\frac{5}{32}$	Koressos	.75

Wheels for Brown & Sharpe Grinding Machines

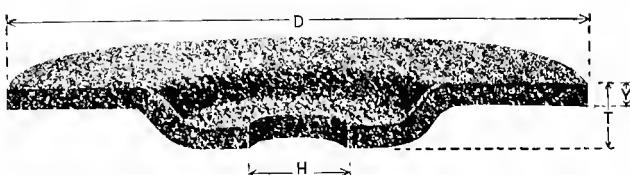


SHAPE	D	T	H					
B & S 80	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{2}$	Abschur	.40			
B & S 81	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{2}$	Absonte	.40			
B & S 82	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$	Absque	.40			
B & S 83	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	Abstand	.40			
B & S 84	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	Abstemious	.40			
B & S 85	$\frac{7}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	Abstematic	.40			
B & S 86	1	$\frac{1}{4}$	$\frac{1}{4}$	Abten	.40			
B & S 87	1	$\frac{1}{4}$	$\frac{1}{4}$	Abthane	.50			
B & S 88	$1\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{8}$	Acclive	.75			
B & S 89	$1\frac{1}{2}$	$\frac{1}{4}$	$\frac{5}{8}$	Accloy	.75			
B & S 90	2	$\frac{1}{4}$	$\frac{5}{8}$	Acedan	.75			
B & S 91	$2\frac{1}{2}$	$\frac{1}{4}$	$\frac{5}{8}$	Acedia	1.00			
B & S 92	$2\frac{1}{2}$	$\frac{1}{4}$	$\frac{5}{8}$	Acetify	1.00			
B & S 95	2	$\frac{1}{4}$	$\frac{5}{8}$	Acedura	.60			
B & S 96	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{5}{8}$	Acatonis	.40			

Wheels for Brown & Sharpe Grinding Machines

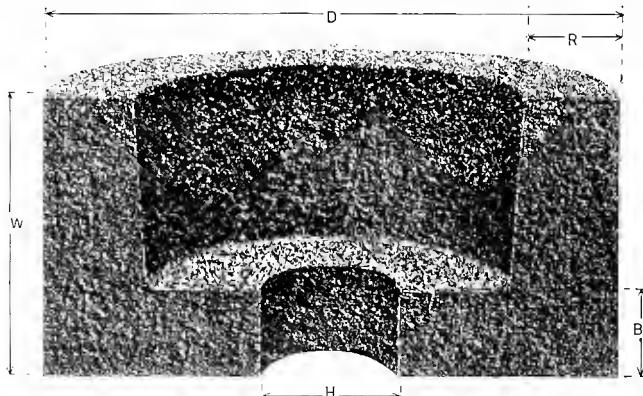


SHAPE	D	T	H	CODE	LIST PRICE
B & S 1	7	$\frac{1}{4}$	2	Abagio	\$2.30
B & S 2	7	$\frac{3}{8}$	$\frac{3}{4}$	Abbot	2.95
B & S 3	12	$\frac{1}{2}$	5	Abbozza	6.00
B & S 5	7	$\frac{1}{2}$	$\frac{3}{4}$	Abedul	2.95
B & S 6	6	$\frac{1}{2}$	$\frac{1}{4}$	Abedules	2.40
B & S 8	9	$\frac{1}{4}$	5	Abeel	5.20
B & S 9	6	$\frac{1}{4}$	$\frac{3}{4}$	Abeelen	1.90
B & S 10	8	$\frac{3}{8}$	2	Abelus	3.55
B & S 12	3	$\frac{1}{4}$	$\frac{3}{4}$	Abegoa	.80
B & S 13	7	$\frac{3}{8}$	2	Abestis	2.95
B & S 14	6	$\frac{1}{2}$	2	Abete	2.40
B & S 15	10	$\frac{1}{2}$	3	Abhorrent	4.90
B & S 20	6	$\frac{3}{8}$	$\frac{1}{2}$	Abiding	2.40
B & S 21	6	$\frac{1}{2}$	$\frac{1}{2}$	Abihud	1.90
B & S 23	7	$\frac{1}{2}$	$1\frac{1}{4}$	Abiliate	2.95
B & S 34	7	$\frac{1}{2}$	3	Abigotado	2.95
B & S 67	14	1	5	Abigoti	11.90
B & S 69	14	2	5	Abiguntur	21.20
B & S 71	18	2	5	Abolition	32.50
B & S 72	18	$\frac{3}{4}$	5	Acervola	14.00
B & S 73	18	1	5	Acervose	17.70
B & S 74	18	$1\frac{1}{2}$	5	Acervule	25.10
B & S 76	12	$\frac{3}{4}$	5	Absceda	7.80
B & S 77	12	1	5	Abscess	9.50
B & S 93	3	$\frac{3}{4}$	$\frac{3}{4}$	Acetose	1.20
B & S 94	12	$1\frac{1}{2}$	5	Acetable	13.10
B & S 102	16	$1\frac{1}{2}$	5	Abolsado	20.50
B & S 104	16	1	5	Acidness	14.60
B & S 113	20	2	5	Acidaro	39.60
B & S 126	14	3	5	Acidates	30.50
B & S 133	12	2	5	Acidetta	16.70
B & S 134	18	3	5	Acidifere	47.20
B & S 135	18	4	5	Acidiferos	62.00
B & S 145	18	5	5	Acidificar	77.50

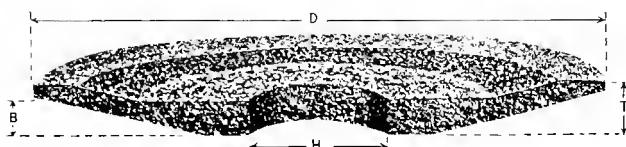


B & S	D	T	H	Y	
B & S 4	12	$1\frac{5}{16}$	2	$\frac{1}{2}$	Abednego 13.10
B & S 75	12	$1\frac{5}{8}$	3	$\frac{1}{2}$	Abonable 13.10

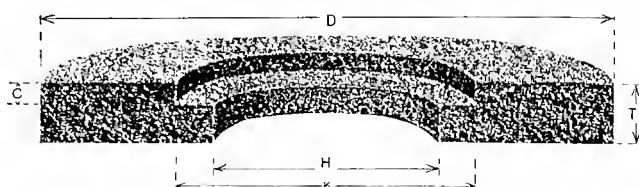
Wheels for Brown & Sharpe Grinding Machines



SHAPE	D	W	H	R	B	CODE	LIST PRICE
B & S 35	2 $\frac{1}{2}$	1 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{8}$	3 $\frac{3}{8}$	Abiliment	\$1.85
B & S 36	3	1 $\frac{1}{2}$	3 $\frac{3}{4}$	3 $\frac{3}{8}$	3 $\frac{3}{8}$	Ablution	1.85
B & S 37	3 $\frac{1}{2}$	1 $\frac{1}{4}$	3 $\frac{3}{4}$	2	2	Abluvion	2.80



	D	T	H	B	CODE	LIST PRICE
B & S 26	6	1 $\frac{7}{16}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	Abimant	2.40
B & S 27	6	1 $\frac{1}{2}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	Abimalie	2.40
B & S 32	8	1 $\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	Abider	4.40
B & S 59	6	1 $\frac{7}{16}$	1 $\frac{3}{4}$	1 $\frac{1}{4}$	Acatry	2.40
B & S 60	6	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{1}{4}$	Ablavius	2.40
B & S 61	4 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	Abolire	1.90
B & S 62	3 $\frac{1}{2}$	1 $\frac{7}{16}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Aboma	1.40

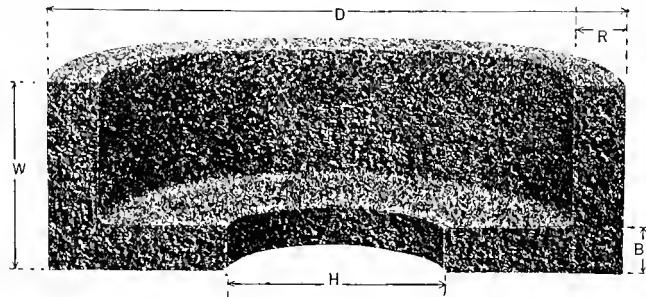


	D	T	H	C	K	CODE	LIST PRICE
B & S 114	20	3	5	1	10	Absdo	58.00
B & S 130	20	4	5	2	10	Absectae	76.00

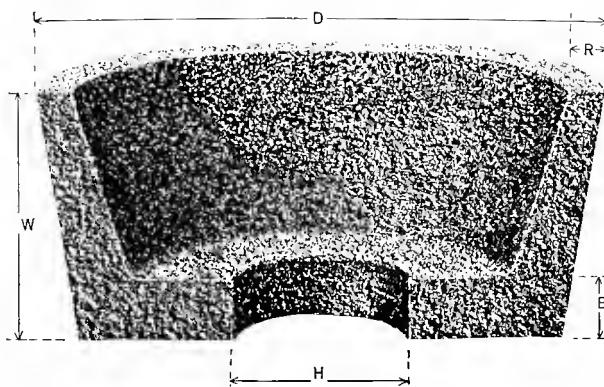
Wheels for Brown & Sharpe Grinding Machines

SHAPE B & S 48	D	$\frac{8}{8}$	T	$\frac{3}{8}$	H	$\frac{2}{2}$	CODE Acerviate	LIST PRICE \$3.55				
	D	$\frac{8}{8}$	W	$\frac{2}{2}$	H	$\frac{1\frac{1}{4}}{2}$	R	$\frac{3}{4}$				
B & S 51	D	$\frac{7}{7}$	W	$\frac{2}{2}$	H	$\frac{1\frac{1}{4}}{2}$	R	$\frac{3}{4}$	B	$\frac{1\frac{1}{2}}{2}$	Ablauben Abodement	6.90
B & S 52	D	$\frac{7}{7}$	W	$\frac{2}{2}$	H	$\frac{2}{2}$	R	$\frac{3}{4}$	B	$\frac{1}{2}$	Ablauben Abodement	6.90
B & S 54	D	$\frac{7}{7}$	W	$\frac{2}{2}$	H	$\frac{3}{3}$	R	$\frac{2\frac{1}{2}}{32}$	B	$\frac{1}{2}$	Aboding	6.90
B & S 99	D	$4\frac{1}{2}$	T	$\frac{3}{4}$	Y	$\frac{1}{2}$	H	$\frac{3}{4}$	C	$\frac{5}{16}$	Asthma	2.25
B & S 100	D	$3\frac{1}{2}$	T	$\frac{3}{4}$	Y	$\frac{3}{8}$	H	$\frac{3}{4}$	C	$\frac{5}{16}$	Ache	1.65
B & S 101	D	$3\frac{1}{2}$	T	$\frac{3}{4}$	Y	$\frac{1}{2}$	H	$\frac{3}{4}$	C	$\frac{5}{16}$	Aching	1.65

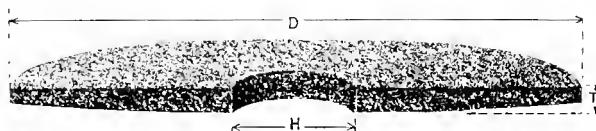
Wheels for Brown & Sharpe Grinding Machines



SHAPE	D	W	H	R	B	CODE	LIST PRICE
B & S 56	8	2 ⁵ / ₈	3	³ / ₄	⁵ / ₈	Abolir	\$11.15

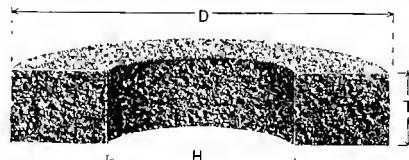
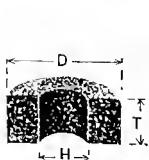


B & S 50	D	W	H	R	B	CODE	LIST PRICE
	4	1 ³ / ₈	1 ¹ / ₄	¹ / ₄	¹ / ₂	Ablaturi	2.55

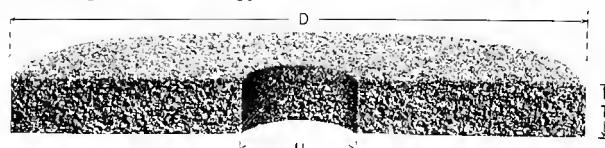


B & S 47	D	T	H		CODE	LIST PRICE
	7	¹ / ₄	³ / ₄		Ablatos	2.30

Wheels for Landis Grinding Machines



SHAPE	D	T	H	CODE	LIST PRICE
Landis	30	$\frac{3}{16}$	$\frac{3}{32}$	Label	\$.40
"	31	$\frac{1}{4}$	$\frac{1}{8}$	Lackey	.40
"	32	$\frac{1}{16}$	$\frac{3}{16}$	Ladder	.40
"	33	$\frac{1}{4}$	$\frac{1}{4}$	Ladify	.40
"	145	$\frac{5}{8}$	$\frac{1}{4}$	Luxury	.40
"	230	$\frac{1}{16}$	$\frac{1}{4}$	Lacerable	.40
"	231	$\frac{5}{8}$	$\frac{1}{4}$	Lacerating	.40
"	232	$\frac{3}{16}$	$\frac{1}{2}$	Lace	.40
"	233	$\frac{3}{4}$	$\frac{7}{16}$	Lachement	.50
"	235	1	$\frac{5}{16}$	Lachrymal	.50
"	237	1	$\frac{7}{16}$	Lacipede	.50
"	238	$\frac{1}{4}$	$\frac{9}{16}$	Lacet	.75
"	239	$\frac{1}{2}$	$\frac{9}{16}$	Laconic	.75
"	240	$\frac{1}{4}$	$\frac{9}{16}$	Lacion	.75
"	241	$\frac{1}{2}$	$\frac{9}{16}$	Lactation	.90
"	242	2	$\frac{9}{16}$	Lacteal	.90
"	243	$\frac{1}{2}$	$\frac{7}{8}$	Lactescent	1.20
"	244	2	$\frac{11}{16}$	Lactifical	.90
"	245	$2\frac{1}{2}$	$\frac{11}{16}$	Lactometer	1.20

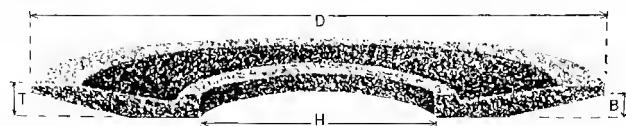


SHAPE	D	T	H	CODE	LIST PRICE
Landis	50	10	$\frac{5}{16}$	Limmer	4.90
"	51	10	$\frac{3}{8}$	Limpid	4.90
"	52	10	$\frac{5}{8}$	Lineage	4.90
"	53	10	$\frac{5}{8}$	Linden	6.20
"	70	12	$\frac{1}{2}$	Lionlike	6.00
"	71	12	$\frac{3}{4}$	Liquid	7.80
"	72	12	1	List	9.50
"	75	14	$\frac{1}{2}$	Literal	7.20
"	76	14	$\frac{3}{4}$	Litus	9.60
"	77	14	1	Livery	11.90
"	101	18	$\frac{3}{4}$	Lobster	14.00
"	102	18	1	Located	17.70
"	103	18	$\frac{1}{2}$	Location	21.40
"	104	18	$\frac{1}{2}$	Locker	25.10
"	106	20	1	Lockless	21.40
"	107	20	$1\frac{1}{2}$	Lockram	30.50
"	110	24	$1\frac{1}{2}$	Logie	39.65
"	111	24	2	Lofty	53.45
"	115	30	$1\frac{1}{2}$	Leap	62.50
"	116	30	2	Lease	81.95
"	117	30	$2\frac{1}{2}$	Leave	102.40

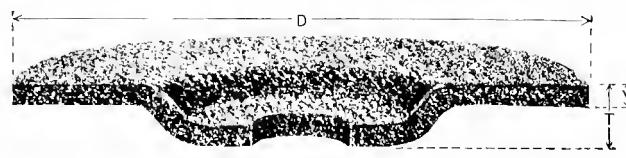
Wheels for Landis Grinding Machines

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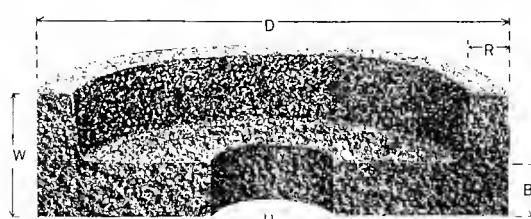
SHAPE	D	T	H	CODE	LIST PRICE
Landis 246	3	$\frac{13}{16}$	1	Lacustrine	\$1.20
" 247	$3\frac{1}{2}$	$\frac{8}{7}$	$1\frac{1}{2}$	Ladybird	1.95
" 248	$4\frac{1}{2}$	$\frac{8}{7}$	$1\frac{1}{2}$	Ladylike	2.65
" 249	6	$\frac{7}{8}$	$1\frac{1}{2}$	Ladyship	3.40
" 344	20	1	8	Ladykin	21.40
" 345	20	$1\frac{1}{4}$	8	Ladyism	25.90
" 351	24	$1\frac{1}{2}$	8	Ladyhood	44.00
" 354	18	$1\frac{1}{2}$	8	Ladillo	25.10
" 356	24	$1\frac{1}{2}$	8	Ladocea	44.00
" 365	24	$1\frac{1}{4}$	8	Ladleful	37.30
" 430	26	$1\frac{5}{8}$	12	League	48.15
" 490	10	$\frac{5}{16}$	5	Lansdale	4.90
" 491	10	$\frac{3}{8}$	5	Lansford	4.90
" 492	10	$\frac{1}{8}$	5	Lansville	4.90
" 493	10	$\frac{5}{8}$	5	Lanston	6.20
" 495	10	$\frac{3}{4}$	5	Lansport	6.20



Landis	54	D 10	T $\frac{1}{2}$	H $4\frac{3}{4}$	B $\frac{3}{2}$	Lintel	4.90
"	73	12	$\frac{5}{8}$	5	$\frac{1}{2}$	Listless	7.80



Landis	55	D 10	T 1	H 3	Y $\frac{3}{8}$	Lioness	7.50
"	74	12	$1\frac{3}{8}$	3	$\frac{1}{2}$	Lispin	13.10



Landis	120	D $2\frac{1}{2}$	W 1	H $\frac{7}{5}$	R $\frac{3}{16}$	B $\frac{7}{16}$	Lordling	1.45
"	121	$3\frac{1}{2}$	1	$\frac{7}{5}$	$\frac{3}{16}$	$\frac{7}{16}$	Lotion	1.95

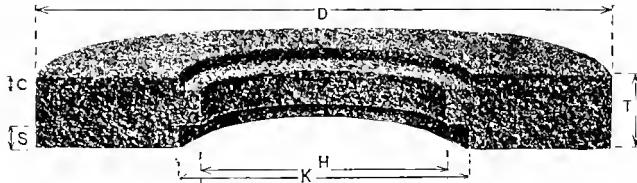
Wheels for Landis Grinding Machines

(Continued)

SHAPE	D	T	H	S	C	K	CODE	LIST PRICE
Landis 140	30	3	14	$\frac{1}{2}$	$\frac{1}{2}$	$17\frac{1}{4}$	Luncheon	\$121.85
" 141	30	4	14	$\frac{1}{2}$	1	$17\frac{1}{4}$	Lunette	160.75
" 257	30	$2\frac{1}{2}$	14	$\frac{1}{4}$	$\frac{1}{4}$	$17\frac{1}{4}$	Lirista	102.40
<hr/>								
Landis	D	T	H	C	K		Lionize	\$6.20
							Loitering	64.25
56	10	$2\frac{3}{4}$	$4\frac{3}{4}$	$\frac{3}{8}$	$5\frac{7}{8}$		Lentil	121.85
" 113	24	$2\frac{1}{2}$	12	$\frac{3}{4}$	15		Loutish	14.20
" 118	30	3	14	$\frac{1}{2}$	$17\frac{1}{2}$		Lessen	160.75
" 126	14	$1\frac{1}{4}$	5	$\frac{1}{2}$	$6\frac{1}{2}$		Lychnis	59.00
" 131	30	4	14	$1\frac{1}{2}$	$17\frac{1}{2}$		Lirella	21.20
" 215	24	2	8	$\frac{1}{4}$	$10\frac{3}{8}$		Liriche	39.60
" 256	14	2	5	1	$6\frac{1}{2}$		Lirico	59.00
" 348	20	2	8	$\frac{1}{2}$	$10\frac{3}{4}$		Liratim	65.00
" 357	24	2	8	$\frac{1}{2}$	$10\frac{3}{4}$		Liriope	51.00
" 367	24	$2\frac{1}{2}$	8	$\frac{3}{4}$	$10\frac{3}{4}$		Lirat	28.80
" 368	24	$1\frac{3}{4}$	8	$\frac{1}{4}$	$10\frac{3}{4}$		Linet	59.00
" 394	18	$1\frac{3}{4}$	8	$\frac{1}{4}$	$10\frac{3}{4}$		Ledge	56.05
" 404	24	$1\frac{7}{8}$	8	$\frac{3}{8}$	$10\frac{3}{4}$		Legal	63.45
" 431	26	$1\frac{5}{8}$	12	$\frac{4}{8}$	15		Legion	63.45
" 432	26	$1\frac{7}{8}$	12	$\frac{3}{8}$	15		Lustiness	15.40
" 433	26	2	12	$\frac{1}{8}$	15			
" 434	26	$2\frac{1}{8}$	12	$\frac{5}{8}$	15			
<hr/>								
Landis 144	D	T	H	C	K		Lustiness	15.40

Wheels for Landis Grinding Machines

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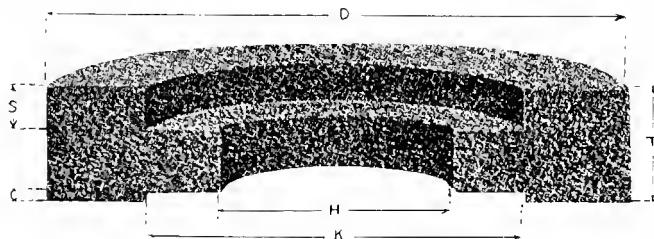


SHAPE	D	T	H	S	C	K	CODE	LIST PRICE
Landis 108	20	2	8	1 4 3 2 1	1 4 3 2 1	11	Locomotion	\$39.60
" 109	20	2 $\frac{1}{2}$	8	1 4 3 2 1	1 4 3 2 1	11	Locus	48.70
" 109A	20	3	8	1 3 2 1	1 3 2 1	11	Lodestone	58.00
" 109B	20	4	8	1 3 2 1	1 3 2 1	11	Lodgers	76.00
" 112	24	3	12	1 3 2 1	1 3 2 1	15	Logan	77.05
" 127	18	2 $\frac{1}{2}$	8	1 3 2 1	1 3 2 1	10 $\frac{3}{4}$	Lovable	39.80
" 133	18	2	8	1 3 2 1	1 3 2 1	10 $\frac{4}{3}$	Lozenge	32.50
" 165	24	2 $\frac{1}{2}$	12	1 3 2 1	1 3 2 1	15	Loppered	64.25
" 166	18	3	8	1 3 2 1	1 3 2 1	10 $\frac{1}{2}$	Lopping	47.20
" 184	14	1 $\frac{1}{2}$	5	7 16	3 16	7 $\frac{1}{4}$	Lungless	16.50
" 185	14	2	5	7 16	3 16	7	Lungwort	21.20
" 211	24	3	8	1 3 2 1	1 3 2 1	10 $\frac{5}{8}$	Longlegs	85.00
" 212	24	4	8	1 3 2 1	1 3 2 1	10 $\frac{8}{5}$	Longtail	113.00
" 213	30	3	8	1 3 2 1	1 3 2 1	10 $\frac{5}{8}$	Longtemps	132.00
" 217	24	1 $\frac{1}{2}$	12	1 3 2 1	1 3 2 1	15	Looby	33.55
" 269	24	1 $\frac{1}{2}$	12	5 16	5 16	15	Libanon	33.55
" 270	24	1 $\frac{3}{8}$	12	5 16	5 16	15	Libant	39.65
" 271	24	1 $\frac{1}{2}$	12	5 8	5 8	15	Libantem	39.65
" 272	24	1 $\frac{5}{8}$	12	5 8	5 8	15	Libarium	46.05
" 273	24	1 $\frac{3}{8}$	12	7 16	7 16	15	Libation	46.05
" 274	24	1 $\frac{1}{8}$	12	7 16	7 16	15	Libatrice	53.45
" 275	24	2	12	7 16	7 16	15	Libaturi	53.45
" 276	24	2 $\frac{1}{8}$	12	1 2	2 1	15	Libavio	58.85
" 277	24	2 $\frac{1}{4}$	12	1 2	2 1	15	Libavisti	58.85
" 278	24	2 $\frac{3}{8}$	12	9 16	9 16	15	Libellant	64.25
" 279	24	2 $\frac{1}{2}$	12	5 8	5 8	15	Libeller	64.25
" 280	24	2 $\frac{3}{4}$	12	5 8	5 8	15	Libelous	70.65
" 281	24	3	12	1 16	1 16	15	Libellula	77.05
" 347	20	2 $\frac{1}{2}$	8	1 3 2 1	1 3 2 1	10 $\frac{3}{4}$	Libentine	48.70
" 349	18	4 $\frac{1}{4}$	8	1 3 2 1	1 3 2 1	10 $\frac{3}{4}$	Liberabit	65.90
" 350	20	2 $\frac{1}{4}$	8	1 3 2 1	1 3 2 1	10 $\frac{3}{4}$	Liberal	44.15
" 355	18	5 $\frac{1}{2}$	8	1 3 2 1	1 3 2 1	11 $\frac{1}{4}$	Librano	85.25
" 358	24	2 $\frac{1}{4}$	8	1 3 2 1	1 3 2 1	11 $\frac{1}{4}$	Libranzo	65.00
" 359	24	2 $\frac{1}{2}$	8	2 3 2 1	3 4 3 2 1	11 $\frac{1}{4}$	Librasse	71.00
" 360	18	5	8	2 3 2 1	3 4 3 2 1	11 $\frac{1}{4}$	Liberecolo	77.50
" 361	20	3	8	2 3 2 1	3 4 3 2 1	11 $\frac{1}{4}$	Libererei	58.00
" 362	14	4	5	2 $\frac{7}{16}$	3 16	10	Liberete	39.80
" 364	18	4	8	1 $\frac{3}{8}$	8 8	11 $\frac{1}{4}$	Liberons	62.00
" 371	18	7	8	3 $\frac{3}{16}$	1 $\frac{9}{16}$	12	Libraire	108.50
" 372	18	6	8	3 $\frac{3}{8}$	3 8	12	Libertiner	93.00
" 374	18	3	8	3 $\frac{3}{8}$	3 8	10 $\frac{3}{4}$	Libethra	47.20
" 375	18	7 $\frac{1}{2}$	8	4 $\frac{5}{8}$	5 8	12	Libica	116.25
" 377	20	3 $\frac{1}{4}$	8	3 $\frac{5}{8}$	3 8	10 $\frac{3}{4}$	Libicos	62.50
" 380	18	3	8	3 $\frac{5}{8}$	3 8	10 $\frac{3}{4}$	Libitum	47.20
" 381	18	2 $\frac{3}{4}$	8	3 $\frac{7}{8}$	3 8	10 $\frac{3}{4}$	Libnah	43.50
" 383	18	3	8	1 $\frac{1}{8}$	3 8	11 $\frac{1}{4}$	Libougo	47.20

Wheels for Landis Grinding Machines

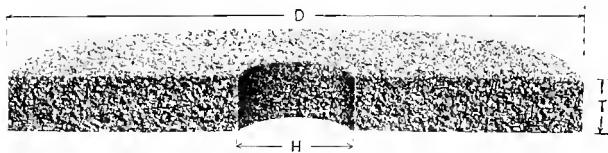
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SHAPE	D	T	H	S	C	K	CODE	LIST PRICE
Landis 385	18	3 $\frac{1}{2}$	8	7 $\frac{3}{8}$	3 $\frac{3}{8}$	11 $\frac{1}{4}$	Libonoti	\$54.60
" 386	14	2	5	5 $\frac{15}{16}$	3 $\frac{3}{8}$	7 $\frac{1}{4}$	Libouret	21.20
" 387	20	4	8	1 $\frac{1}{8}$	5 $\frac{5}{16}$	11 $\frac{1}{4}$	Librabis	76.00
" 388	20	5 $\frac{1}{2}$	8	2 $\frac{5}{8}$	5 $\frac{5}{16}$	11 $\frac{1}{4}$	Libraeo	104.50
" 391	24	2 $\frac{3}{4}$	8	8 $\frac{5}{8}$	8 $\frac{5}{16}$	10 $\frac{3}{4}$	Liriope	78.00
" 392	14	1 $\frac{1}{4}$	5	3 $\frac{3}{8}$	3 $\frac{3}{8}$	7 $\frac{1}{4}$	Lirismo	14.20
" 393	14	2 $\frac{1}{2}$	5	5 $\frac{15}{16}$	3 $\frac{3}{8}$	7 $\frac{1}{4}$	Lirista	25.80
" 405	24	2 $\frac{7}{8}$	8	4 $\frac{1}{2}$	8 $\frac{5}{16}$	10 $\frac{3}{4}$	Lirocone	85.00
" 406	24	3	8	7 $\frac{3}{8}$	8 $\frac{5}{16}$	10 $\frac{3}{4}$	Lirodia	85.00

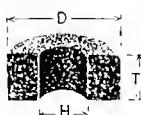


SHAPE	D	T	H	S	C	K	CODE	LIST PRICE
Landis 142	30	5	14	1 $\frac{1}{2}$	1 $\frac{1}{2}$	17 $\frac{1}{4}$	Lull	200.90
" 229	36	3 $\frac{1}{2}$	12	1 $\frac{1}{4}$	1	15	Luster	203.90
" 259	36	2 $\frac{1}{2}$	12	1 $\frac{1}{2}$	1 $\frac{1}{2}$	15	Lunge	147.25
" 260	36	2 $\frac{3}{4}$	12	1 $\frac{1}{2}$	1 $\frac{1}{2}$	15	Lurk	161.25
" 261	36	3	12	2 $\frac{5}{8}$	5 $\frac{5}{16}$	15	Lucent	175.00
" 373	14	3	5	1 $\frac{7}{16}$	3 $\frac{3}{8}$	7 $\frac{1}{2}$	Libertino	30.50
" 396	18	4 $\frac{1}{2}$	8	1 $\frac{7}{16}$	3 $\frac{3}{8}$	11 $\frac{1}{4}$	Libyci	69.75
" 397	20	3 $\frac{1}{2}$	8	1 $\frac{5}{8}$	5 $\frac{5}{16}$	11 $\frac{1}{4}$	Libycum	67.00
" 398	20	4 $\frac{1}{2}$	8	1 $\frac{5}{8}$	5 $\frac{5}{16}$	11 $\frac{1}{4}$	Licanie	85.50
" 399	20	5	8	2 $\frac{1}{8}$	5 $\frac{5}{16}$	11 $\frac{1}{4}$	Licaone	95.00
" 400	20	6	8	3 $\frac{1}{8}$	5 $\frac{5}{16}$	11 $\frac{1}{4}$	Licence	114.00
" 401	20	6 $\frac{1}{2}$	8	3 $\frac{1}{8}$	5 $\frac{5}{16}$	11 $\frac{1}{4}$	Licencia	123.50
" 402	20	7	8	4 $\frac{1}{8}$	5 $\frac{5}{16}$	11 $\frac{1}{4}$	Licensed	133.00
" 403	20	7 $\frac{1}{2}$	8	4 $\frac{1}{8}$	5 $\frac{5}{16}$	11 $\frac{1}{4}$	Licensure	142.50
" 435	26	2 $\frac{1}{4}$	12	5 $\frac{5}{8}$	1 $\frac{1}{8}$	15	Lever	70.85
" 436	26	2 $\frac{3}{8}$	12	5 $\frac{5}{8}$	1 $\frac{1}{8}$	15	Learn	78.25
" 437	26	2 $\frac{1}{2}$	12	5 $\frac{5}{8}$	1 $\frac{1}{8}$	15	Lecture	78.25
" 438	26	2 $\frac{3}{8}$	12	5 $\frac{5}{8}$	1 $\frac{1}{8}$	15	Legacy	85.70
" 439	26	2 $\frac{7}{8}$	12	5 $\frac{5}{8}$	1 $\frac{1}{8}$	15	Legible	93.10
" 440	26	3	12	5 $\frac{5}{8}$	7 $\frac{7}{8}$	15	Loom	93.10

Wheels for Modern Tool Grinding Machines



MACHINE	D	T	H	CODE	LIST	PRICE
1	6	2 ¹ / ₂	1 ¹ / ₂	Modam	\$2.40	
1	6	3 ⁵ / ₈	1 ¹ / ₂	Modal	2.90	
1	8	3 ³ / ₈	2	Moder	3.55	
1	8	2 ¹ / ₂	2	Moden	3.55	
1	8	3 ³ / ₄	2	Modem	4.40	
2	7	2 ¹ / ₂	2	Modaw	2.95	
2	7	3 ³ / ₄	2	Modat	3.60	
2	10	3 ¹ / ₂	3	Modas	4.90	
2	10	1	3	Modab	7.50	
3	8	1 ¹ / ₂	2	Modie	3.55	
3	8	3 ³ / ₄	2	Modid	4.40	
3	14	1 ¹ / ₄	5	Modia	14.20	
3	14	1 ¹ / ₂	5	Moday	16.50	
8	9	1	2 ¹ / ₄	Modif	6.30	
12	12	1 ¹ / ₄	5	Modin	11.30	
16 and 18	20	2	5	Modek	39.60	
Plain S. C. Grinder	18	2	5	Modir	32.50	
" " "	18	2	8	Model	32.50	
" " "	18	2 ¹ / ₂	8	Modgu	39.80	
" " "	18	2 ³ / ₄	8	Modha	43.50	
" " "	18	3	8	Modgi	47.20	
" " "	18	3 ¹ / ₄	8	Modep	50.90	

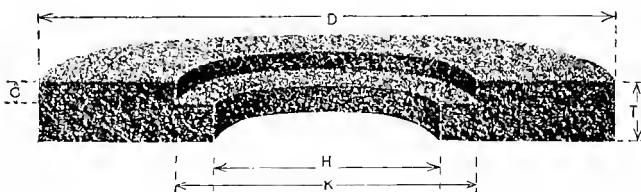


Internal Fixture	D	T	H	Code	List	Price
" "	1 ¹ / ₂	1 ¹ / ₄	1 ¹ / ₈	Mace	.40	
" "	1 ¹ / ₂	2 ¹ / ₄	1 ³ / ₁₆	Machinet	.40	
" "	1 ¹ / ₂	3 ¹ / ₄	1 ¹ / ₄	Madely	.40	
" "	1 ¹ / ₂	3 ¹ / ₄	1 ¹ / ₄	Magician	.40	
" "	1 ¹ / ₂	3 ⁵ / ₈	1 ¹ / ₄	Magnitude	.40	
" "	1 ¹ / ₂	3 ⁵ / ₈	1 ¹ / ₄	Maintain	.40	
" "	1 ¹ / ₂	3 ⁷ / ₈	1 ¹ / ₄	Majestic	.40	
" "	1 ¹ / ₂	1	1 ¹ / ₄	Malefactor	.40	
" "	1 ¹ / ₂	1	1 ⁵ / ₁₆	Malleablet	.50	
" "	1 ¹ / ₂	1 ¹ / ₈	1 ¹ / ₄	Mammoth	.60	
" "	1 ¹ / ₂	1 ¹ / ₄	1 ¹ / ₄	Mandrill	.60	
" "	1 ¹ / ₂	1 ¹ / ₄	1 ³ / ₈	Mangle	.75	
" "	1 ¹ / ₂	1 ¹ / ₈	1 ¹ / ₄	Mangrove	.60	
" "	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₄	Mannish	.60	
" "	1 ¹ / ₂	2 ¹ / ₈	1 ⁵ / ₈	Mattern	.75	

Wheels for Modern Tool Grinding Machines

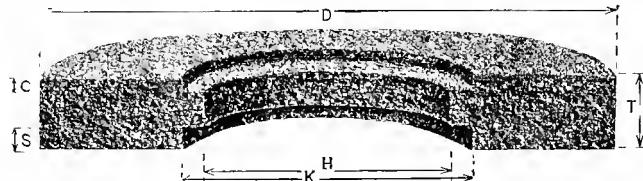
(Continued)

MACHINE	D	T	H	CODE	LIST PRICE
Internal Fixture	$1\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	Mature	\$0.60
" "	$1\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	Maul	.75
" "	2	$\frac{1}{4}$	$\frac{1}{2}$	Mayor	.60
" "	2	$\frac{1}{4}$	3	Medium	.75
" "	2	$\frac{1}{4}$	8	Medley	.75
" "	$2\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	Meek	.80
" "	$2\frac{1}{4}$	$\frac{1}{4}$	4	Mellow	1.00
" "	$2\frac{1}{4}$	$\frac{1}{4}$	8	Melt	1.00
" "	$2\frac{1}{4}$	$\frac{1}{4}$	2	Menace	.80
" "	$2\frac{1}{2}$	$\frac{1}{4}$	4	Mend	1.00
" "	$2\frac{1}{2}$	$\frac{1}{4}$	8	Mentor	1.00
" "	$2\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	Merge	.80
" "	$2\frac{3}{4}$	$\frac{1}{4}$	1	Merit	1.00
" "	$2\frac{3}{4}$	$\frac{1}{4}$	8	Merry	.80
" "	3	$\frac{1}{4}$	$\frac{1}{2}$	Mesh	1.00
" "	3	$\frac{1}{4}$	8	Metal	1.10
" "	$3\frac{1}{4}$	$\frac{1}{4}$	2	Meter	1.90
	5	$\frac{1}{4}$	2		



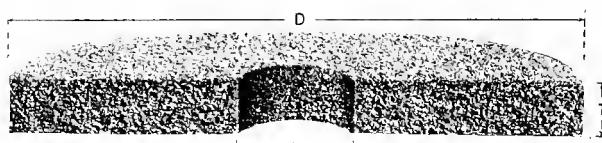
MACHINE	D	T	H	C	K	CODE	LIST PRICE
Plain S. C. Grinder	18	$2\frac{1}{2}$	5	$\frac{1}{2}$	8	Modis	39.80
" "	18	$2\frac{3}{4}$	5	$\frac{3}{4}$	8	Modod	43.50
" "	18	3	5	1	8	Modit	47.20
" "	18	$3\frac{1}{2}$	5	$1\frac{1}{2}$	8	Modoa	54.60
" "	18	$3\frac{1}{2}$	8	$1\frac{1}{2}$	$10\frac{1}{2}$	Modyx	54.60
" "	18	$3\frac{3}{4}$	8	$1\frac{3}{4}$	$10\frac{1}{2}$	Modyp	58.30
" "	18	4	8	1	$10\frac{1}{2}$	Modyu	62.00
" "	18	$4\frac{1}{2}$	8	$1\frac{1}{2}$	$10\frac{1}{2}$	Modyo	69.75
" "	18	5	8	2	$10\frac{1}{2}$	Modga	77.50
" "	18	$5\frac{1}{4}$	8	$2\frac{1}{4}$	$10\frac{1}{2}$	Modge	81.40
" "	18	$5\frac{1}{2}$	8	$2\frac{1}{2}$	$10\frac{1}{2}$	Modgm	85.25

Wheels for Modern Tool Grinding Machines (Continued)

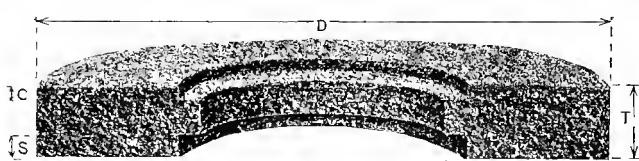


MACHINE	D	T	H	C	S	K	CODE	LIST	PRICE
Plain S. C. Grinder	18	4	5	1 ⁵ / ₈	3 ³ / ₈	8	Modux	\$62.00	
" "	18	5	8	5 ⁵ / ₈	8 ⁸ / ₁₆	10 ¹ / ₂	Modof	77.50	
" "	18	5 ¹ / ₄	8	5 ⁵ / ₈	5 ⁵ / ₈	10 ¹ / ₂	Modoe	81.40	
" "	18	6	8	4 ¹ / ₄	2 ³ / ₄	10 ¹ / ₂	Modoc	93.00	
" "	18	7	8	1 ¹ / ₄	2 ³ / ₄	10 ¹ / ₂	Modgo	108.50	
" "	24	1 ³ / ₄	12	7 ⁷ / ₁₆	7 ⁷ / ₁₆	15	Modub	46.05	
" "	24	2	12	7 ⁷ / ₁₆	7 ⁷ / ₁₆	15	Modud	53.45	
" "	24	2 ¹ / ₄	12	7 ⁷ / ₁₆	5 ⁵ / ₁₆	15	Moduf	58.85	
" "	24	2 ¹ / ₂	12	7 ⁷ / ₁₆	5 ⁵ / ₁₆	15	Modul	64.25	
" "	24	3	12	7 ⁷ / ₁₆	5 ⁵ / ₁₆	15	Modum	77.05	
Plain S. C. Crank Gr.	30	1 ¹ / ₂	12	8 ³ / ₁₆	8 ³ / ₁₆	15	Modun	63.65	
" "	30	1 ³ / ₄	12	7 ⁷ / ₁₆	7 ⁷ / ₁₆	15	Modur	74.05	
" "	30	2	12	7 ⁷ / ₁₆	7 ⁷ / ₁₆	15	Modus	83.45	
" "	30	2 ¹ / ₄	12	7 ⁷ / ₁₆	5 ⁵ / ₁₆	15	Modut	93.85	
" "	30	2 ¹ / ₂	12	7 ⁷ / ₁₆	5 ⁵ / ₁₆	15	Moduw	104.25	

Wheels for Fitchburg Grinding Machines

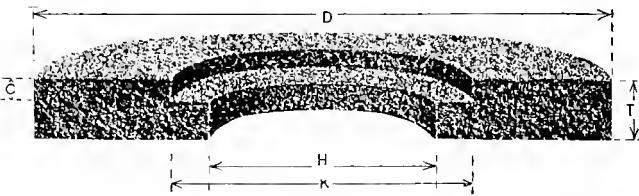


SHAPE	D	T	H			
Fitchburg 47	16	1	5	Finary		14.60



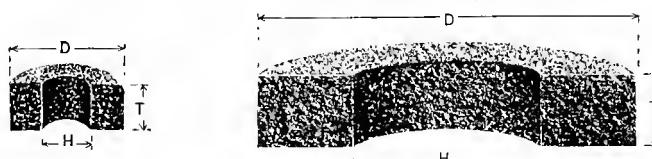
FITCHBURG	D	T	H	S	C	K	FINASSER	LIST	PRICE
39	16	2	5	7 ⁷ / ₁₆	7 ⁷ / ₁₆	7 ³ / ₄			26.50
" 43	16	3	5	10 ⁹ / ₁₆	10 ⁹ / ₁₆	7 ³ / ₄	Finasters		38.30
" 46	16	4	5	1 ¹¹ / ₁₆	1 ¹¹ / ₁₆	7 ³ / ₄	Finative		50.20
" 48	16	6	5	1 ¹ / ₂	1 ¹ / ₂	7 ³ / ₄	Finback		75.30
" 49	16	8	5	3 ¹ / ₂	1 ¹ / ₂	7 ³ / ₄	Fincape		100.40

Wheels for Queen City Grinding Machines

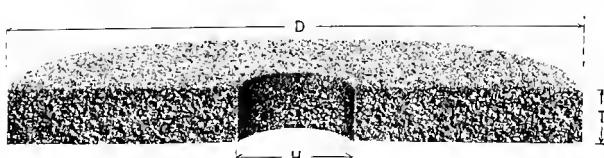


SHAPE	D	T	H	C	K	CODE	LIST	PRICE
Queen City 1	24	3	8	1 $\frac{5}{8}$	10 $\frac{1}{2}$	Quedito	\$85.00	
" " 2	24	2	8	1 $\frac{5}{8}$	10 $\frac{1}{2}$	Quedo	59.00	
" " 3	20	3	8	1 $\frac{5}{8}$	10 $\frac{1}{2}$	Queendom	58.00	
" " 4	20	2	8	1 $\frac{5}{8}$	10 $\frac{1}{2}$	Queened	39.60	
" " 5	18	6	8	3	10 $\frac{1}{2}$	Queenhood	93.00	
" " 6	18	6	5	4 $\frac{5}{8}$	7	Queening	93.00	
" " 7	18	5	8	2	10 $\frac{1}{2}$	Queenlike	77.50	
" " 8	18	5	5	3 $\frac{5}{8}$	7	Queenly	77.50	
" " 9	18	3	5	1 $\frac{5}{8}$	7	Queenpost	47.20	
" " 10	18	2 $\frac{1}{2}$	5	1 $\frac{1}{8}$	7	Queenship	39.80	
" " 11	16	3	5	1 $\frac{5}{8}$	7	Queerish	38.30	
" " 12	14	3	5	1 $\frac{5}{8}$	7	Querity	30.50	

Wheels for Cincinnati Grinding Machines



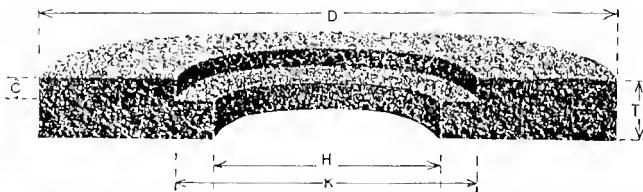
MACHINE	SHAPE	D	T	H		
Internal Fixture Wheels	3	1 $\frac{1}{4}$	$\frac{3}{8}$	$\frac{5}{8}$	Caballion	.75
" "	4	2	$\frac{3}{8}$	$\frac{5}{8}$	Cabanal	.75
" "	6	3	$\frac{3}{8}$	1	Cabanon	1.00
" "	7	2	$\frac{3}{8}$	1	Cabareter	.75
" "	8	2 $\frac{1}{2}$	$\frac{3}{8}$	1	Cabassou	1.00
" "	9	1 $\frac{7}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	Cabecao	.40
" "	10	1 $\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	Cabedelo	.40
" "	11	1 $\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	Cabeiric	.40
" "	12	1 $\frac{1}{2}$	$\frac{3}{8}$	$\frac{5}{8}$	Cabeliau	.75
" "	14	4	$\frac{3}{8}$	1	Cabellera	1.40



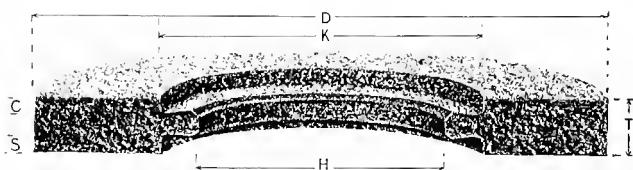
UNIVERSAL AND PLAIN GRINDER	SHAPE	D	T	H		
" "	2	14	1	5	Cabalgo	11.90
" "	13	18	2	5	Cabalism	32.50
" "	15	14	2	5	Cabalgue	21.20

Wheels for Cincinnati Grinding Machines

(Continued)

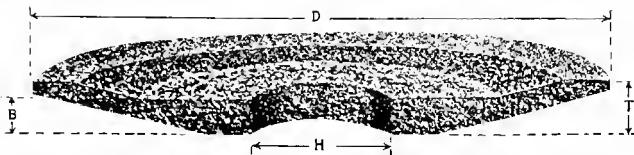


MACHINE	SHAPE	D	T	H	C	K	CODE	LIST	PRICE
Universal and Plain Grinder	1	14	1 1/2	5	1 1/2	9	Cabeloso	\$16.50	
" " "	16	18	2 1/2	5	1 1/2	10 3/4	Caberro	39.80	
" " "	17	18	3	5	1	10 3/4	Cabodo	47.20	
" " "	18	14	4	5	2	9	Cabern	39.80	
" " "	19	14	3	5	1	9	Cabasto	30.50	
" " "	20	14	2 1/2	5	1 1/2	9	Cabasco	25.80	
" " "	21	18	4	5	2	10 3/4	Cabire	62.00	

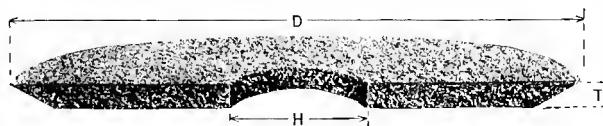


C. S. Grinder	SHAPE	D	T	H	C	S	K		
" "	22	22	2	12	1 7/16	1 7/16	14 5/8	Cab	42.15
" "	23	22	2 1/8	12	1 7/16	1 7/16	14 8/8	Cabal	47.20
" "	24	22	2 1/4	12	1 7/16	1 7/16	14 5/8	Cabas	47.20
" "	25	22	2 3/8	12	1 7/16	1 9/16	14 5/8	Cabaret	52.25
" "	26	22	2 1/2	12	1 7/16	1 1/16	14 5/8	Caboose	52.25
" "	27	22	2 5/8	12	1 7/16	1 3/16	14 5/8	Cabriolet	57.15
" "	28	22	2 1/4	12	1 7/16	1 5/16	14 5/8	Cabinet	57.15
" "	29	22	2 7/8	12	1 7/16	1 1/16	14 5/8	Cabet	62.05
" "	30	22	3	12	1 7/16	1 3/16	14 5/8	Cabinda	62.05
" "	31	22	3 1/8	12	1 7/16	1 5/16	14 5/8	Cabot	67.00
" "	32	22	3 1/4	12	1 7/16	1 7/16	14 5/8	Cabrera	67.00
" "	33	22	3 3/8	12	1 7/16	1 9/16	14 5/8	Cabul	71.90
" "	34	22	3 1/2	12	1 7/16	1 1/16	14 5/8	Cabyle	71.90
" "	35	22	3 5/8	12	1 7/16	1 1/16	14 5/8	Cabbage	76.80
" "	36	22	3 1/4	12	1 7/16	1 5/16	14 5/8	Cablegram	76.80
" "	37	22	3 7/8	12	1 7/16	2 1/16	14 5/8	Cabalera	81.70
" "	38	22	4	12	1 7/16	2 3/16	14 5/8	Cablette	81.70

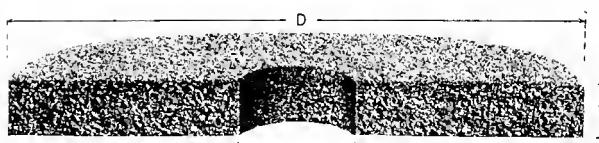
Wheels for Walker Grinding Machines



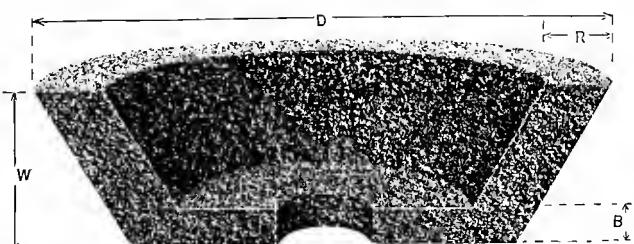
SHAPE	D	T	H	B	CODE	LIST PRICE
Walker 1 W	3	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{3}{8}$	Wagtail	\$1.00
" 2 W	$3\frac{1}{2}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{4}$	Wailfully	1.40
" 3 W	$4\frac{1}{2}$	$\frac{15}{16}$	$\frac{1}{2}$	$\frac{3}{16}$	Wainage	1.90
" 10 W, coarse	6	$\frac{1}{16}$	$1\frac{1}{4}$	$\frac{3}{8}$	Waltz	2.90
" 30 W, fine	6	$\frac{9}{16}$	$1\frac{1}{4}$	$\frac{3}{8}$	Wheatear	2.90



Walker 8 W	D	T	H		Walnut	1.50
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MACHINE	SHAPE	D	T	H		
	Walker 14 W, coarse	6	$\frac{1}{2}$	$1\frac{1}{4}$	Watchtower	2.40
	" 31 W, fine	6	$\frac{1}{2}$	$1\frac{1}{4}$	Whetstone	2.40
	" 40 A	8	$\frac{3}{8}$	$1\frac{1}{4}$	Womanly	3.55
	" 49 A	8	$\frac{1}{2}$	$1\frac{1}{4}$	Worshipful	3.55
$1\frac{1}{2}$ Sur. Gr.	" 50 A	7	$\frac{1}{2}$	$1\frac{1}{4}$	Wheatgrass	2.95
$2\frac{1}{2}$ " "	" 51 A	8	$\frac{1}{2}$	$1\frac{1}{4}$	Wheedle	3.55
3 " "	" 52 A	10	$\frac{3}{8}$	$1\frac{3}{4}$	Wheedling	6.20
4 " "		10	$\frac{3}{8}$	$1\frac{3}{4}$	Wheelage	6.20



SHAPE	D	W	H	R	B		
Walker 15 W	7	2	$1\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{2}$	Waterbird	6.90

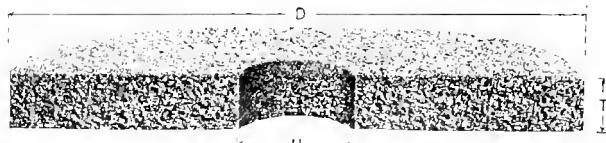
Wheels for Walker Grinding Machines (Continued)

SHAPE Walker	11 W	D $5\frac{1}{2}$	T $\frac{5}{16}$	H $1\frac{1}{4}$	CODE	LIST PRICE		
	17 W	$5\frac{1}{2}$	$\frac{5}{16}$	$1\frac{1}{4}$	Warping	\$2.40		
	" 21 W, coarse	$\frac{7}{4}$	$\frac{1}{16}$	$1\frac{1}{4}$	Watercress	2.40		
	" 32 W, fine	$\frac{7}{4}$	$\frac{1}{2}$	$1\frac{1}{4}$	Waterspout	2.95		
Walker 12 W		D 7	T $\frac{1}{16}$	H $1\frac{1}{4}$	Wicket	2.95		
					Washtub	2.30		
Walker 5 W		D 5	T $3\frac{1}{4}$	Y $\frac{1}{4}$	Wallwort	6.75		
					(Collet for above, \$1.00)			
MACHINE Sur. Gr.	SHAPE Walker 53 A	D 8	W 3	H 4	R $\frac{5}{8}$	B $\frac{9}{16}$	Worldling	12.00

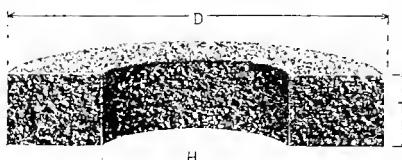
Wheels for Walker Grinding Machines (Continued)

SHAPE	D	T	H	C	K	CODE	LIST PRICE
Walker 22 W	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{1}{16}$	Waxend	.40
" 23 W	$\frac{7}{16}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{1}{16}$	Waylay	.40
" 24 W	$\frac{9}{16}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{1}{16}$	Wealsman	.40
" 25 W	$\frac{11}{16}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{1}{16}$	Weaponless	.40
" 26 W	$\frac{13}{16}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{1}{16}$	Weftage	.40
" 27 W	$\frac{15}{16}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{1}{16}$	Weichling	.40
" 33 W	$\frac{11}{16}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{13}{32}$	Wideness	.50
" 34 W	$\frac{13}{16}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{15}{32}$	Winnowing	.50
" 35 W	$\frac{15}{16}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{17}{32}$	Wiping	.50
" 36 W	$1\frac{1}{16}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{19}{32}$	Wiseacre	.75
" 37 W	$1\frac{3}{16}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{13}{32}$	Witchtree	.75
" 38 W	$1\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{15}{32}$	Witterung	.75
" 39 W	$1\frac{7}{16}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{17}{32}$	Wittiness	.75
Walker 47 A, hard	D	T	H	$1\frac{1}{4}$		Worker	3.55
" 48 A, soft	8	$\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{4}$		World	3.55
Walker 28 W, coarse	D	W	H	R	B	Welch	2.55
" 29 W, fine	4	$1\frac{3}{8}$	$1\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	Welcoming	2.55
" 41 A, coarse	$4\frac{1}{2}$	$1\frac{3}{8}$	$1\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	Wooddove	4.15
" 42 A, fine	$4\frac{1}{2}$	2	$1\frac{1}{4}$	$\frac{5}{16}$	$\frac{1}{2}$	Woodlark	4.15

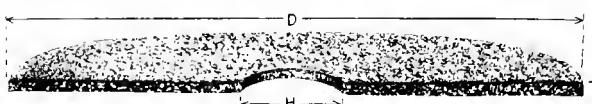
Wheels for Cincinnati Universal C. and T. Grinding Machines



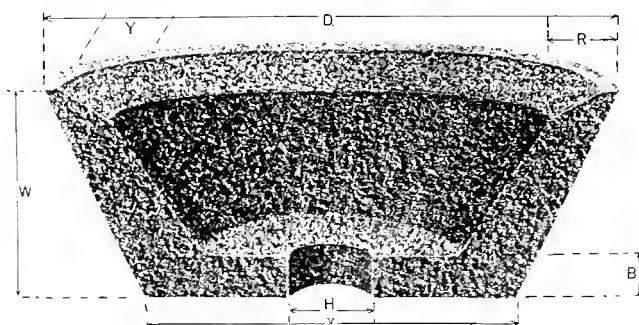
MACHINE	SHAPE	D	T	H	CODE	LIST PRICE
No. 1	Cincinnati 1	3	$\frac{1}{8}$	$\frac{1}{2}$	Cigarette	.80
No. 2	Cincinnati 10	4	$\frac{1}{4}$	$\frac{3}{4}$	Civility	1.10
No. 2	Cincinnati 11	6	$\frac{3}{8}$	$\frac{4}{3}$	Clacking	2.40
No. 2	Cincinnati 12	10	$\frac{1}{2}$	$\frac{3}{4}$	Clamber	4.90



	D	T	H	CODE	LIST PRICE	
No. 1	Cincinnati 6	$\frac{7}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	Circus	.40
No. 2	Cincinnati 9	1	$\frac{1}{4}$	$\frac{1}{4}$	Civilian	.40



	D	T	H	CODE	LIST PRICE	
No. 1	Cincinnati 5	6	$\frac{1}{8}$	$\frac{1}{2}$	Circuit	1.90
No. 1	Cincinnati 7	8	$\frac{1}{16}$	$\frac{1}{2}$	Citron	2.70

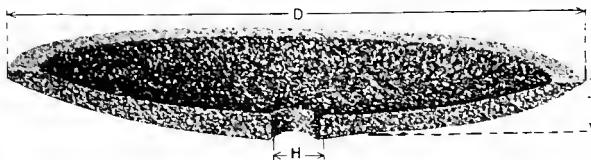


	D	W	H	R	B	K	Y	CODE	LIST PRICE	
No. 1	Cincinnati 2	$3\frac{1}{4}$	$1\frac{1}{4}$	$\frac{1}{2}$	$\frac{5}{16}$	$\frac{1}{4}$	$2\frac{1}{2}$	30°	Cimbrado	2.25
No. 2	Cincinnati 13	4	$1\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	3	30°	Clank	2.55
No. 2	Cincinnati 14	6	2	$\frac{3}{4}$	$\frac{7}{16}$	$\frac{1}{2}$	$4\frac{3}{8}$	30°	Clapper	5.40

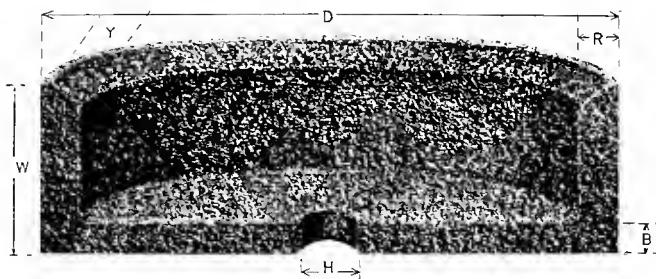
When so ordered, we furnish Nos. 1, 10, 11, 12, 5, 2, 13 and 14 wheels mounted on steel bushings at an extra charge of 15 cents each

Wheels for Cincinnati Universal C. and T. Grinding Machines

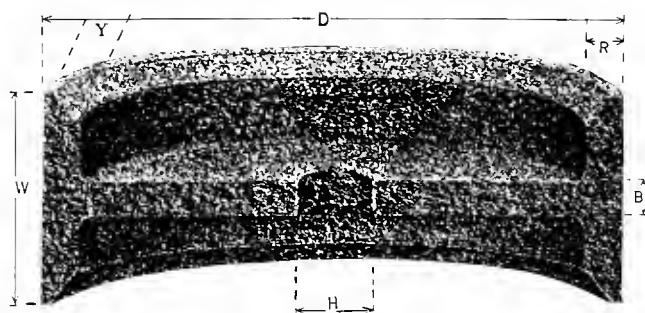
(Continued)



MACHINE	SHAPE	D	T	H	CODE	LIST PRICE
No. 1	Cincinnati 3	6	$\frac{11}{16}$	$\frac{1}{2}$	Cimolite	\$2.90
No. 2	Cincinnati 16	6	$\frac{7}{8}$	$\frac{3}{4}$	Clawing	3.40



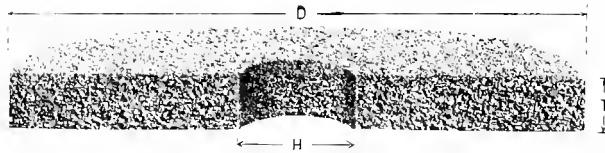
No. 1	Cincinnati 4	D	W	H	R	B	Y	Cindery	3.40
		5	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{16}$	$\frac{5}{16}$	45°		



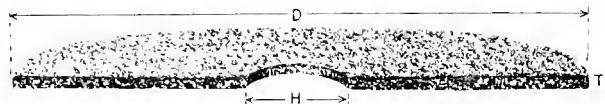
No. 1	Cincinnati 8	D	W	H	R	B	Y	Civerunt	2.55
No. 2	Cincinnati 15	4	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$	45°	Classic	2.55

When so ordered, we furnish the above wheels mounted on steel bushings at an extra charge of 15 cents each.

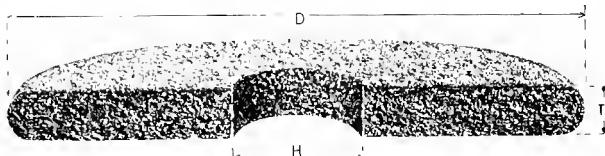
Wheels for Bath Grinding Machines



SHAPE	D	T	H	CODE	LIST PRICE
Bath 1	12	$\frac{5}{8}$	5	Besoin	\$7.80
" 2	12	$\frac{1}{2}$	5	Biberist	6.00
" 3	10	$\frac{1}{2}$	5	Binary	4.90
" 4	8	$\frac{3}{8}$	$1\frac{1}{8}$	Binding	3.55
" 6	6	$\frac{3}{8}$	$1\frac{1}{8}$	Biographer	2.40
" 7	6	$\frac{1}{2}$	$1\frac{1}{8}$	Birch	2.40
" 10	6	$\frac{1}{4}$	$1\frac{1}{8}$	Bitumen	1.90
" 11	3	$\frac{1}{4}$	$1\frac{1}{8}$	Bivalve	.80
" 25	12	1	5	Betray	9.50
" 42	10	$\frac{3}{4}$	$3\frac{1}{2}$	Basely	6.20



Bath 5	D	T	H		
	8	$\frac{1}{8}$	$1\frac{1}{8}$	Binomial	2.70



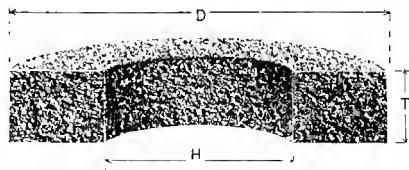
Bath 8	D	T	H		
	6	$\frac{3}{8}$	$1\frac{1}{8}$	Birthday	2.40



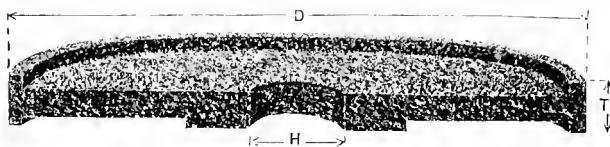
Bath 9	D	T	H		
	6	$\frac{3}{8}$	$1\frac{1}{8}$	Birthright	2.40

Wheels for Bath Grinding Machines

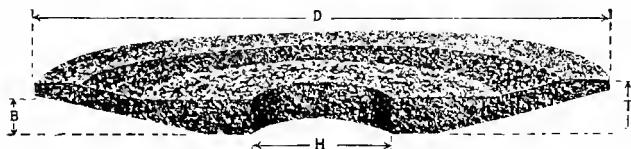
(Continued)



SHAPE	D	T	H	CODE	LIST PRICE
Bath 12	1 $\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$	Blackbird	\$.60
" 13	1	$\frac{1}{4}$	$\frac{1}{4}$	Bland	.40
" 14	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	Blarney	.40

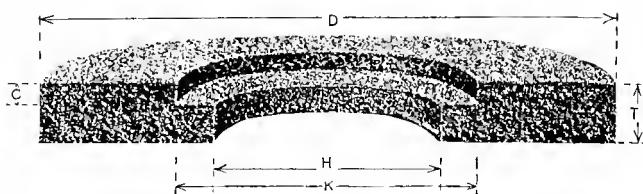


Bath 15	D	T	H	Code	List Price
	8	$\frac{3}{4}$	$1 \frac{3}{8}$	Blemish	4.40



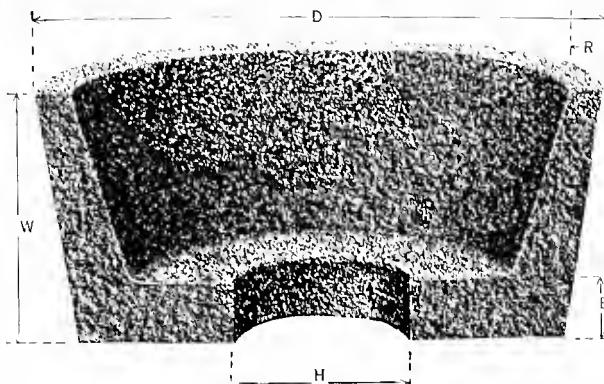
Bath 16	D	T	H	B	Code	List Price
" 17	6	$\frac{9}{16}$	$1 \frac{3}{8}$	$\frac{3}{8}$	Blindfold	2.90
" 21	4	$\frac{17}{16}$	$\frac{1}{2}$	$\frac{5}{16}$	Blindly	1.40

Bath 21	D	T	H	B	Code	List Price
	12	$1 \frac{1}{8}$	5	$\frac{3}{4}$	Besotted	11.30

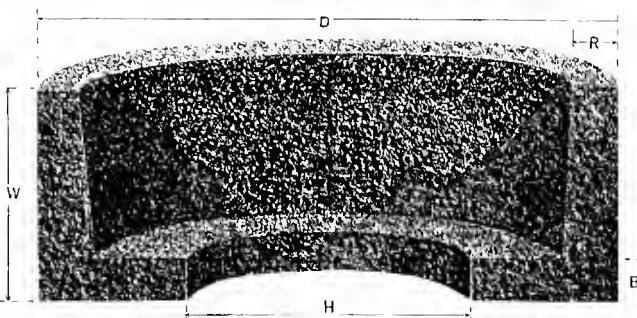


Bath 26	D	T	H	C	K	Code	List Price
	12	$1 \frac{1}{2}$	5	$\frac{1}{2}$	7	Baselle	13.10

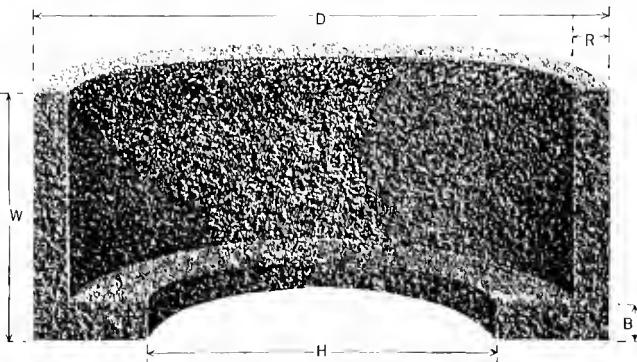
Wheels for Bath Grinding Machines (Continued)



SHAPE	D	W	H	R	B	Code	LIST PRICE
Bath 22	3 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1	$\frac{5}{16}$	Besougt	\$2.55

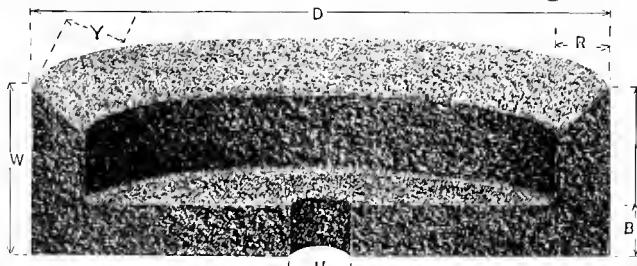


SHAPE	D	W	H	R	B	Code	LIST PRICE
Bath 23	4	2 $\frac{3}{4}$	1 $\frac{3}{8}$	1	$\frac{1}{2}$	Bespatter	4.00

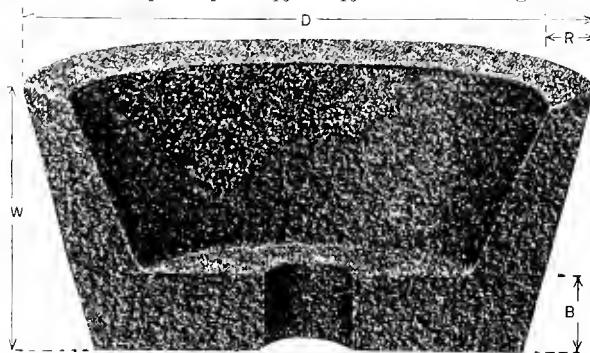


SHAPE	D	W	H	R	B	Code	LIST PRICE
Bath 24 " 27	8 6	3 $\frac{1}{2}$ 1 $\frac{1}{4}$	5 1 $\frac{3}{8}$	1 $\frac{1}{2}$ $\frac{1}{2}$	$\frac{1}{2}$ $\frac{1}{2}$	Bestial Basenets	13.70 4.95

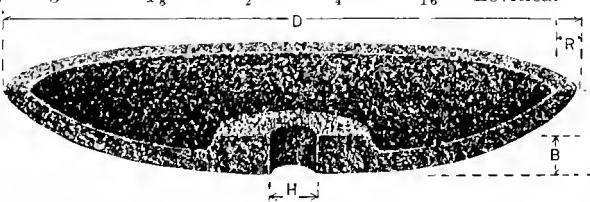
Wheels for LeBlond Cutter and Tool Grinding Machines



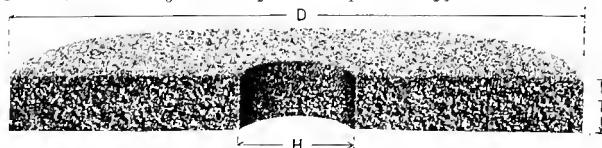
SHAPE D W H R B Y CODE LIST PRICE
LeBlond 1 5 $1\frac{1}{2}$ $\frac{1}{2}$ $\frac{7}{16}$ $\frac{7}{16}$ 45° Levigate \$3.40



LeBlond 2	D 3	W $\frac{1}{8}$	H $\frac{1}{2}$	R $\frac{1}{4}$	B $\frac{7}{16}$	Levitical	1.85
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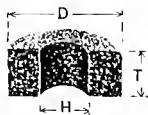
LeBlond 3 D T H R B Levrauder 3.40



LeBlond 4	D 6	T $\frac{3}{8}$	H $\frac{1}{2}$	Lewdly	2.40
" 5	3	$\frac{3}{8}$	$\frac{1}{2}$	Lewdness	.80

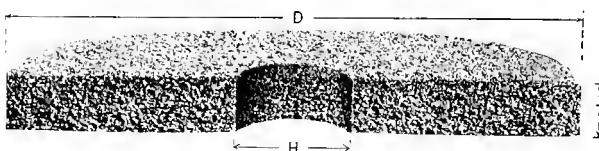
When so ordered, we furnish the above wheels mounted on steel bushings at an extra charge of 15 cents each.

Wheels for LeBlond Cutter and Tool Grinding Machines (Continued)

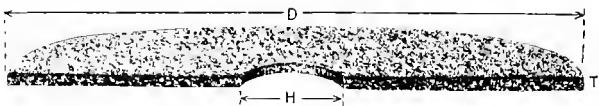


SHAPE	D	T	H	CODE	LIST PRICE
LeBlond 6	$\frac{7}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	Lexicon	\$.40
" 7	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	Lexieology	.40

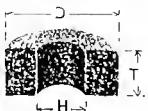
Wheels for Oesterlein Universal C. and T. Grinding Machines



Oesterlein	1	D	T	H	Occurrent	.80
"	9	3	$\frac{1}{8}$	$\frac{1}{2}$	Otaechord	.80
"	15	3	$\frac{1}{8}$	$\frac{5}{8}$	Octangular	3.55
		8	$\frac{1}{2}$	$\frac{3}{8}$		



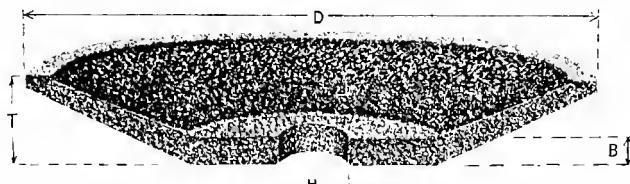
Oesterlein	5	D	T	H	Ochre	1.90
"	12	6	$\frac{1}{8}$	$\frac{5}{8}$	Octagonal	1.90
		6	$\frac{1}{8}$			



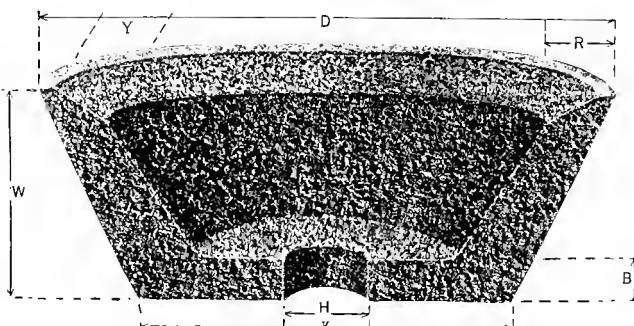
Oesterlein	2	D	T	H	Ocellated	.40
		$\frac{7}{8}$	$\frac{1}{4}$	$\frac{1}{4}$		

When so ordered, we furnish Oesterlein Shapes 1, 9, 15, 5 and 12, mounted on steel bushings at an extra charge of 15 cents each.

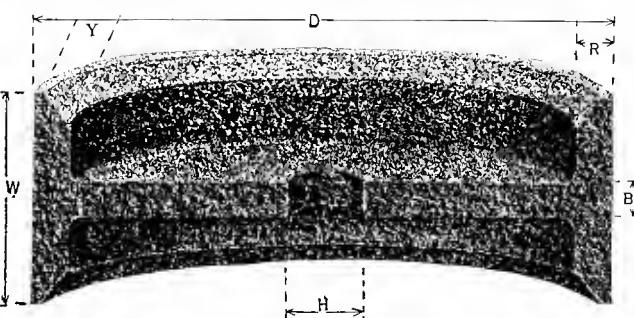
Wheels for Oesterlein Universal C. and T. Grinding Machines (Continued)



SHAPE		D	T	H	B	CODE	LIST PRICE
Oesterlein	3	6	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{5}{16}$	Ocean	\$3.40
"	10	6	$\frac{7}{8}$	$\frac{5}{8}$	$\frac{1}{16}$	Octaedre	3.40



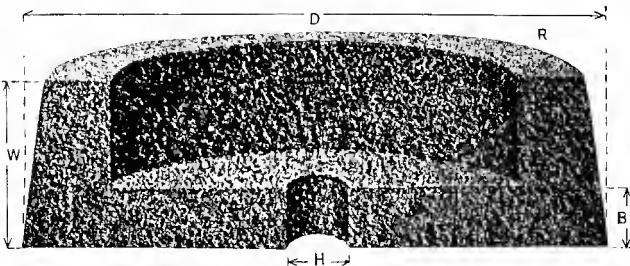
Oesterlein		D	W	H	R	B	K	Y	
"	4	5	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{16}$	$\frac{5}{16}$	$3\frac{1}{4}$	30°	Oceanique
"	7	$3\frac{1}{4}$	$1\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$	$1\frac{1}{16}$	30°	Ochreous
"	11	5	$1\frac{3}{4}$	$\frac{5}{8}$	$\frac{5}{16}$	$\frac{5}{16}$	3	30°	Octagon
"	13	$3\frac{1}{2}$	$1\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$1\frac{3}{4}$	30°	Octahedron
									2.55



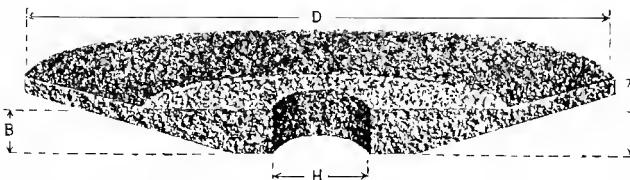
Oesterlein		D	W	H	R	B	Y	
"	8	4	$1\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{4}$	60°	Ochovado
"	14	4	2	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	60°	Octandria

When so ordered, we furnish the above wheels mounted on steel bushings at an extra charge of 15 cents each.

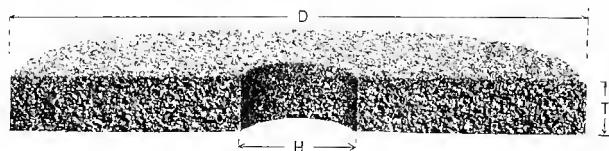
Wheels for Greenfield Universal Grinding Machines



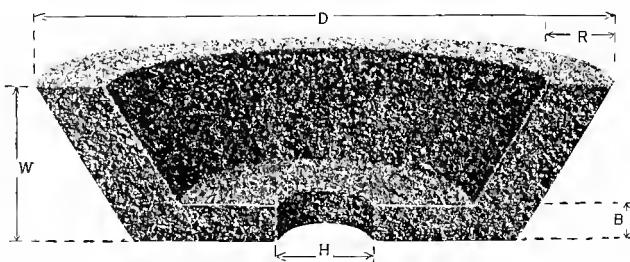
SHAPE	D	W	H	R	B	CODE	LIST PRICE
Greenfield 1	5	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{2}$	Waggish	\$3.40



SHAPE	D	T	H	B	CODE	LIST PRICE
Greenfield 2	$4\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	Waggled	1.90

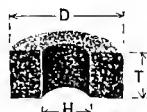


SHAPE	D	T	H	CODE	LIST PRICE
Greenfield 3	4	$\frac{1}{2}$	$\frac{1}{2}$	Waghals	1.40



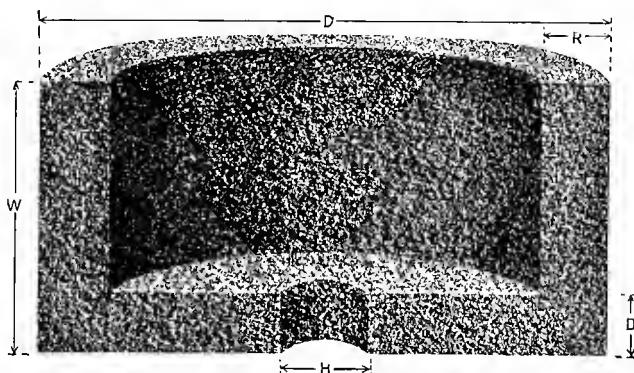
SHAPE	D	W	H	R	B	CODE	LIST PRICE
Greenfield 4	3	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$	Wag	1.85

Wheels for Greenfield Universal Grinding Machines (Continued)

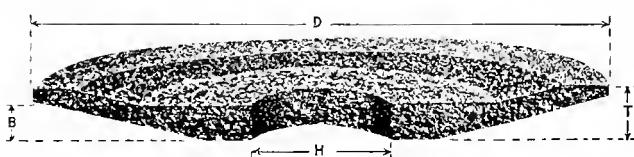


SHAPE	D	T	H	CODE	LIST PRICE
Greenfield 5	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	Wagner	\$.40

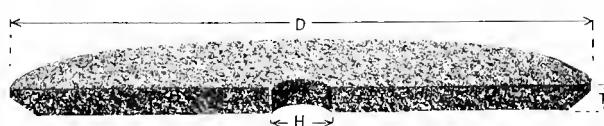
Wheels for Wells Cutter and Reamer Grinding Machines



	D	W	H	R	B	Wearer	LIST PRICE
Wells 1	$4\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Wearer	3.40



	D	T	H	B	Weasel	LIST PRICE
Wells 2	$4\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	Weasel	1.90



	D	T	H	Wedge	LIST PRICE
Wells 3	$4\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	Wedge	1.50

Wheels for Wells Cutter and Reamer Grinding Machines (Continued)

SHAPE	D	T	H	CODE	LIST PRICE
				Wells 4	Weepers \$1.90
" 5	4 $\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	Wolfish	.90
Wells 6	1	$\frac{1}{2}$	$\frac{1}{5}$	Wooed	.40
" 7	$\frac{3}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	Workbox	.40
" 8	$\frac{5}{6}$	$\frac{3}{5}$	$\frac{1}{5}$	Wreathed	.40
" 9	$\frac{7}{8}$	$\frac{1}{6}$	$\frac{1}{5}$	Wrestling	.40
" 10	$\frac{3}{4}$	$\frac{1}{6}$	$\frac{1}{5}$	Wriggle	.40

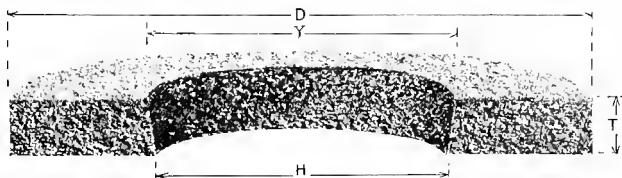
Wheels for Ingersoll Cutter Grinding Machines

SHAPE	D	T	H	Y	K	CODE	LIST PRICE
						Ingersoll 1	.40
	10	$\frac{1}{2}$	1	$\frac{1}{4}$	$5\frac{1}{2}$	Ingress	4.90

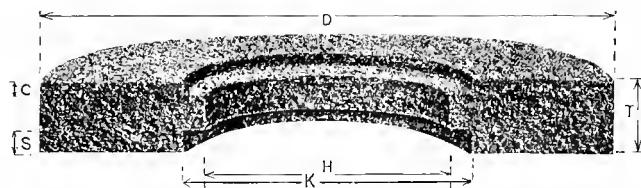
Wheels for Farrel Roll Grinding Machines

MACHINE	D	T	H	Y	CODE	LIST PRICE
					16-Inch	Fun 10.20
20-Inch	12	$1\frac{1}{2}$	$4\frac{15}{16}$	$5\frac{3}{16}$	Function	13.10
30-Inch	14	$1\frac{1}{2}$	$4\frac{15}{16}$	$5\frac{3}{16}$	Furbish	16.50
Concaving	18	$1\frac{1}{4}$	12	$12\frac{1}{4}$	Fusarolle	23.85

Wheels for Morton Poole Roll Grinding Machines

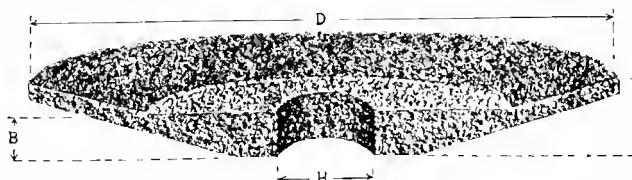


SHAPE	D	T	H	Y	CODE	LIST PRICE
Poole 6 P	14	1½	7	7½	Poesy	\$16.50



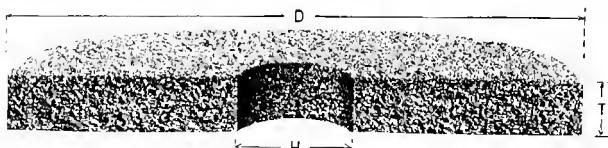
Poole	D	T	H	S	C	K		
" 10	10	1½	5	5/16	5/16	6	Popgun	10.20
" 10	10	1½	6	5/16	5/16	6 1/16	Populate	10.20

Wheels for Gould and Eberhardt Cutter Grinding Machines

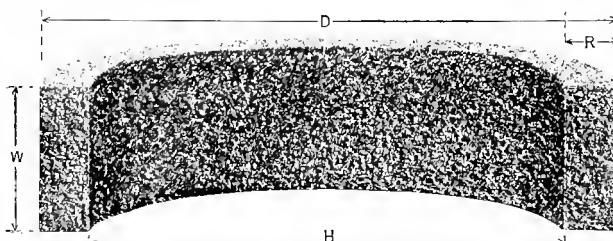


MACHINE	D	T	H	B		
No. 1	8	1	1	5/8	Governar	5.20
No. 2	12	1	4	5/8	Governess	9.50

Wheels for Morse Grinding Machines

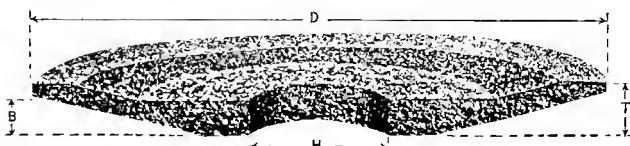


MACHINE	D	T	H	CODE	LIST PRICE
No. 1	10	$\frac{5}{8}$	4	Monacle	\$6.20
No. 1	10	$\frac{5}{8}$	5	Mollop	6.20
No. 1	10	$\frac{8}{8}$	4	Morsicain	6.20
No. 2	14	1	5	Morsico	11.90
No. 3	16	$1\frac{1}{2}$	5	Maori	20.50
Wet Tool Grinder Leland and Fauleoner	24	$1\frac{1}{2}$	10	Mortar	44.00
No. 1 Universal	6	$\frac{3}{8}$	2	Mapalis	2.40
No. 1 Universal	10	$\frac{4}{8}$	4	Maphalda	6.20
No. 2 Universal	7	$\frac{3}{8}$	2	Mortmain	2.95
No. 2 Universal	12	$\frac{3}{8}$	5	Morsalt	7.80
No. 2 Universal	12	1	5	Mortify	9.50
No. 2 Universal	14	$\frac{3}{4}$	7	Mortals	9.60
No. 2 Bench	6	2	1	Maoch	5.40
No. 2 Bench	6	$\frac{3}{8}$	$\frac{3}{4}$	Maoney	2.40



Face Grinder	D	W	H	R	Morsel	12.00
	8	3	$5\frac{1}{2}$	$1\frac{1}{4}$		

Union Twist Drill Co. Grinding Machines



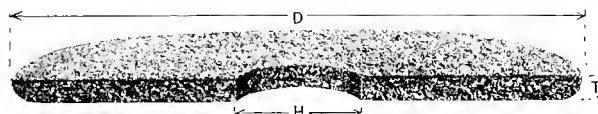
No. 2 and 3 Formed Cutter Grinder Hob Grinding	D	T	H	B	Ulmaire	3.40
	6	$\frac{13}{16}$	$\frac{3}{4}$	$\frac{1}{2}$	Ulliade	4.40

Union Twist Drill Co. Grinding Machines (Continued)

Cutter and Reamer	D	W	H	R	B	CODE	LIST PRICE
	2½	1¼	½	¼	¼	Ullueo	\$1.65

Wheels for Wilmarth & Morman Grinding Machines

MACHINE—NEW YANKEE	D	W	H	R	B		
A, B, C, D, P (wet), R, M, X,	9½	1½	1½	1½	5/8	Youngster	10.20
H & L	5	1	1 3/16	¾	½	Yardarm	2.65
J & K	7	1	1 1/16	1 1/4	1 1/2	Yonder	4.30
B, PO & PN, Swing Attach.	10	3	1	1	1 1/4	Youngest	18.00
FO, Swing Attach.	12	3	1	1 ½	1 1/4	Yelling	23.80

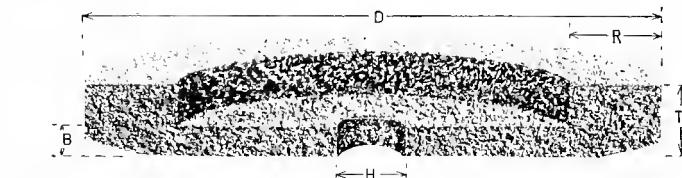


Point Thinning Wheels

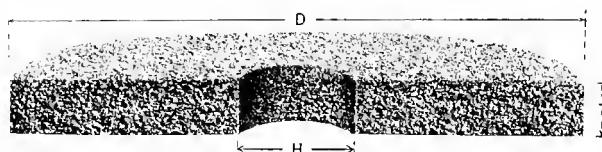
	D	T	H		
H & L	5	1/4	1 1/16	Yarrow	1.50
J & K	7	3/8	1 1/16	Young	2.95
A, B, C, D, P (wet), R, M, X,	10	1/2	1	Youthful	4.90
F & N (wet)	12	5/8	1	Yellowboy	7.80

Wheels for Wilmarth & Morman Grinding Machines

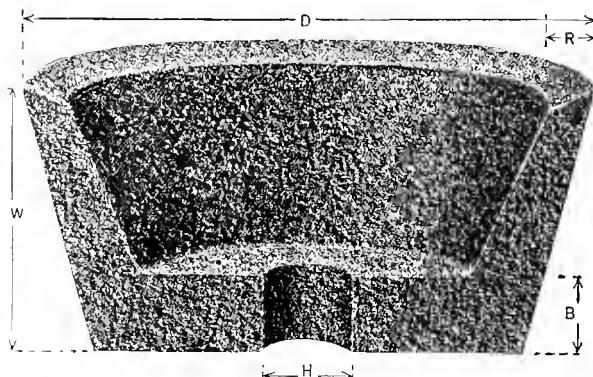
(Continued)



MACHINE	D	T	H	R	B	CODE	LIST PRICE
F & N (wet)	12	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	—	Yearn	\$13.10
G (wet)	20	2 $\frac{3}{4}$	2	3	1 $\frac{3}{4}$	Yewberry	53.35
WFL	12	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1	—	Yew	11.30



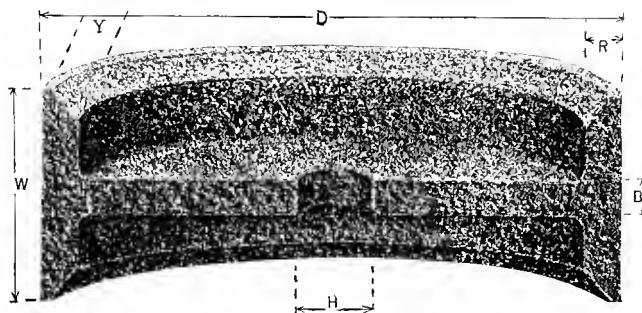
	D	T	H			
Universal No. 1	6	—	—	Yewtree	1.90	
" No. 1	6	—	—	Yeast	2.40	
Surface Grinder	7	—	—	Yeoman	2.95	
" "	10	—	—	Yawnset	7.50	
" "	12	—	—	Yavers	9.50	
Tool Grinder	16	2	—	Yuletide	26.50	



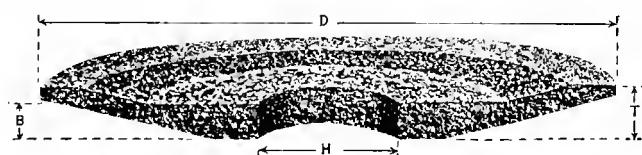
Universal No. 1	D	W	H	R	B	Yewless	1.85
	2 $\frac{1}{4}$	1 $\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{16}$	$\frac{5}{16}$		

Wheels for Wilmarth & Morman Grinding Machines

(Continued)



MACHINE	D	W	H	R	B	Y	CODE	LIST PRICE
Universal No. 1	5	2	1½	¾	⅞	45°	Yewcom	\$4.15

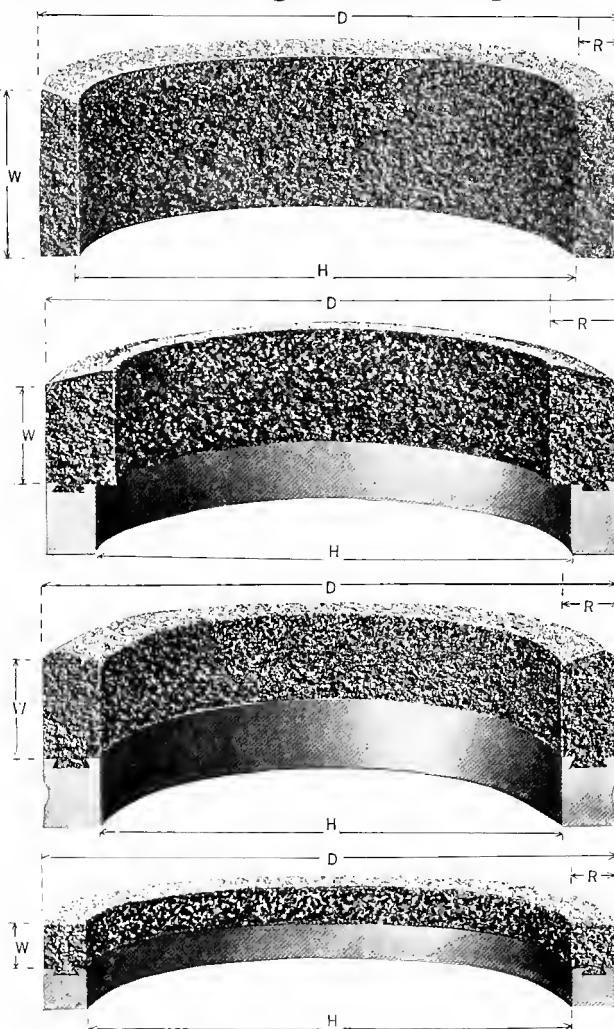


	D	T	H	B	CODE	LIST PRICE
Universal No. 1	6	¾	1½	11/16	Youngest	2.90



	D	T	H	CODE	LIST PRICE
Internal Attach. "	11/16 1 1/4	3/8 3/8	1/4 1/4	Yonthling Yardstick	.30 .75

Wheels for Hemming Bros. Grinding Machines

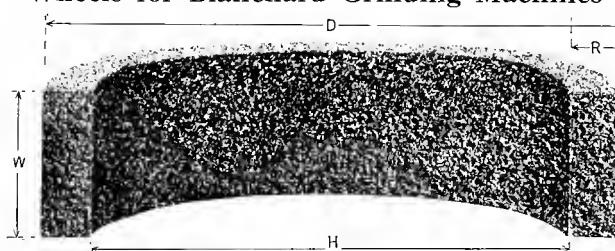


MACHINE	D	W	H	R	CODE	LIST PRICE
Hemming Gr.	12	2	10	1	Hathor	\$16.70
" "	12	2 $\frac{1}{4}$	9 $\frac{3}{4}$	1 $\frac{1}{8}$	Hereticide	18.45
" "	12	2 $\frac{3}{8}$	9 $\frac{3}{4}$	1 $\frac{1}{8}$	Hatille	20.20
" "	12	2 $\frac{1}{2}$	9 $\frac{1}{2}$	1 $\frac{1}{8}$	Hatilos	20.20
" "	12	2 $\frac{1}{2}$	9 $\frac{3}{4}$	1 $\frac{1}{8}$	Hatless	20.20
" "	12	2 $\frac{5}{8}$	9 $\frac{3}{4}$	1 $\frac{1}{8}$	Hatred	22.00
" "	12	2 $\frac{3}{4}$	9 $\frac{3}{4}$	1 $\frac{1}{8}$	Hatstand	22.00
" "	12	2 $\frac{7}{8}$	9 $\frac{3}{4}$	1 $\frac{1}{8}$	Hatteria	23.70
" "	12	3	9 $\frac{1}{4}$	1 $\frac{1}{8}$	Hattush	23.70

Wheels for Hemming Bros. Grinding Machines (Continued)

MACHINE	D	W	H	R	CODE	LIST PRICE
Hemming Gr.	12	3 $\frac{1}{4}$	9 $\frac{3}{4}$	1 $\frac{1}{8}$	Haubarer	\$23.70
" "	12	3	9 $\frac{1}{2}$	1 $\frac{1}{4}$	Haubergh	23.70
" "	12	3 $\frac{3}{4}$	9 $\frac{3}{4}$	1 $\frac{1}{8}$	Hauchen	23.70
" "	12	4	9 $\frac{3}{4}$	1 $\frac{1}{8}$	Haudegen	23.70
" "	14	2 $\frac{1}{4}$	12	1	Hauender	17.35
" "	14	2 $\frac{1}{2}$	12	1	Hauerite	19.05
" "	14	2 $\frac{1}{2}$	11	1 $\frac{1}{2}$	Heriotable	25.80
" "	14	2 $\frac{7}{8}$	12	1	Haugeld	22.55
" "	14	3	12	1	Haughtily	22.55
" "	14	3	12 $\frac{3}{4}$	5 $\frac{5}{8}$	Haugien	22.55
" "	14	3 $\frac{5}{8}$	12 $\frac{3}{4}$	5 $\frac{5}{8}$	Hauled	27.75
" "	14	3 $\frac{1}{4}$	12 $\frac{3}{4}$	5 $\frac{5}{8}$	Hauloch	24.30
" "	14	3 $\frac{1}{4}$	13 $\frac{1}{16}$	1 $\frac{5}{2}$	Haunches	24.30
" "	14	3 $\frac{1}{4}$	13 $\frac{1}{4}$	3 $\frac{3}{2}$	Haunting	24.30
" "	14	3 $\frac{1}{4}$	13 $\frac{3}{8}$	5 $\frac{5}{8}$	Haupt	24.30
" "	14	3 $\frac{1}{2}$	12 $\frac{5}{8}$	8	Havoc	26.00
" "	14	3 $\frac{1}{2}$	12	1	Hawbuck	26.00
" "	14	4	12 $\frac{3}{4}$	5 $\frac{5}{8}$	Hawfinch	27.30
" "	14	4	12	1	Helmage	27.30
" "	14	4	11 $\frac{1}{2}$	1 $\frac{1}{4}$	Hawkboy	29.05
" "	14	4 $\frac{1}{2}$	11 $\frac{3}{4}$	1 $\frac{1}{8}$	Hawser	35.05
" "	16	2 $\frac{1}{2}$	14	1	Hayal	23.80
" "	16	2 $\frac{1}{2}$	13 $\frac{1}{4}$	1 $\frac{3}{8}$	Hazel	25.65
" "	16	2 $\frac{7}{8}$	13 $\frac{1}{2}$	1 $\frac{1}{4}$	Hazelly	30.35
" "	16	3 $\frac{1}{2}$	13 $\frac{1}{2}$	1 $\frac{1}{4}$	Hazenlip	35.20
" "	16	3 $\frac{1}{2}$	15 $\frac{1}{4}$	3 $\frac{3}{8}$	Headfast	32.60
" "	16	3 $\frac{1}{2}$	13 $\frac{1}{4}$	1 $\frac{3}{8}$	Headful	35.20
" "	16	3 $\frac{5}{8}$	13 $\frac{1}{2}$	1 $\frac{1}{4}$	Headland	37.55
" "	16	4	13	1 $\frac{1}{2}$	Headly	36.30
" "	16	4	14	1	Headmen	34.20
" "	16	4	13 $\frac{1}{2}$	1 $\frac{1}{4}$	Herbage	36.30
" "	16	4 $\frac{1}{4}$	13 $\frac{1}{2}$	1 $\frac{1}{4}$	Headmost	43.80
" "	30	2 $\frac{1}{2}$	26	2	Heritage	82.65
" "	30	2 $\frac{5}{8}$	27 $\frac{1}{2}$	1 $\frac{1}{4}$	Headshake	91.00
" "	30	3 $\frac{5}{16}$	26	2	Headship	114.00
" "	30	3 $\frac{3}{4}$	27	1 $\frac{1}{2}$	Headsman	122.35
" "	30	3 $\frac{13}{16}$	27 $\frac{1}{2}$	1 $\frac{1}{4}$	Headstall	108.45

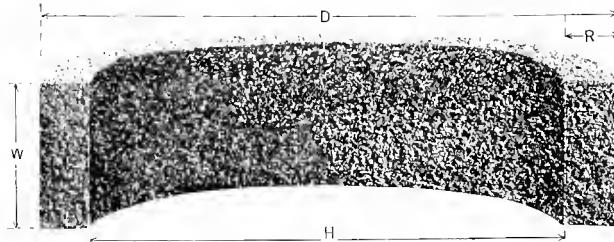
Wheels for Blanchard Grinding Machines



MACHINE	SHAPE	D	W	H	R	CODE	LIST PRICE
Belted Vertical Surface Blanchard	1	16	5	14	1	Blandish	41.10
" " "	2	16	5	13 $\frac{1}{2}$	1 $\frac{1}{4}$	Blandness	43.80
" " "	3	16	5	13	1 $\frac{1}{2}$	Blanket	43.80
Direct Motor Drive Ver. Surface	4	18	5	15 $\frac{1}{2}$	1 $\frac{1}{4}$	Blando	54.30
" " "	5	18	5	15	1 $\frac{1}{2}$	Blandona	54.30
" " "	10	10	4	8	1	Blanch	21.00

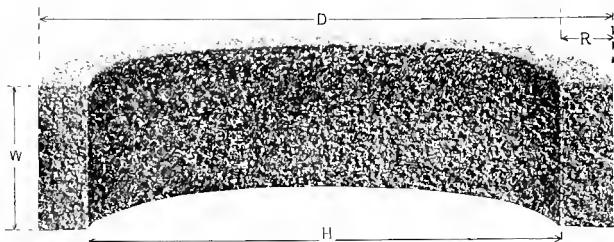
An extra charge of 75 cents is made for wire bands on these wheels.

Wheels for Besly Grinders



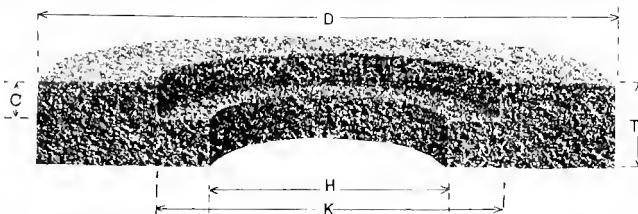
MACHINE	D	W	H	R	CODE	LIST PRICE
Helmet, Pressed Steel Ring Chucks	10	2 $\frac{1}{2}$	8	1	Zeal	\$15.40
" "	10	2 $\frac{1}{2}$	6	2	Zealot	15.40
" "	12	3	10	1	Zebra	23.80
" "	12	3	7	2 $\frac{1}{2}$	Zebu	23.80
" "	14	4	12	1	Zedoary	27.30
" "	14	4	9	2 $\frac{1}{2}$	Zenith	32.20
" "	15	4	12	1 $\frac{1}{2}$	Zephyr	36.30
" "	15	4	9	3	Zest	41.25
" "	16	4	13	1 $\frac{1}{2}$	Zibet	36.30
" "	16	4	10	3	Zigzag	41.25
" "	18	4	15	1 $\frac{1}{2}$	Zion	45.00
" "	18	4	10	4	Zither	54.70
" "	21	5	17	2	Zodiac	82.90
" "	24	5	20	2	Zone	94.75
" "	30	6	26	2	Zoology	161.50

Wheels for Gardner Grinders

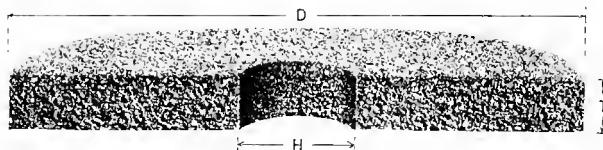


MACHINE	D	W	H	R	CODE	LIST PRICE
Perfection Ring Wheel Chucks	8	2 $\frac{1}{2}$	6	1	Zouave	10.30
" "	10	3	7	1 $\frac{1}{2}$	Zounds	18.00
" "	12	3	8	2	Zumology	23.80
" "	14	4	9	2 $\frac{1}{2}$	Zumpat	32.20
" "	16	4	10	3	Ziget	41.25
" "	18	4 $\frac{3}{4}$	11	3 $\frac{1}{2}$	Zioned	64.00
" "	20	5 $\frac{1}{4}$	12	4	Zealous	91.30
" "	24	6 $\frac{1}{2}$	14	5	Zesting	162.10

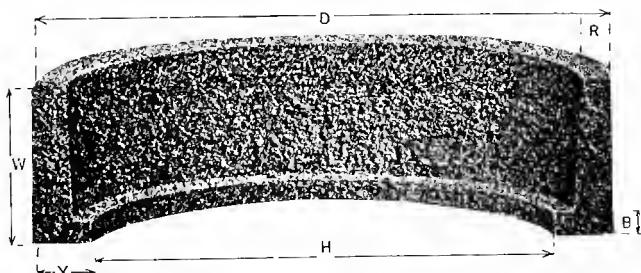
Wheels for Pratt & Whitney Grinding Machines



MACHINE	D	T	H	C	K	CODE	LIST PRICE
4 x 30 Inches}	12	2	5	$\frac{3}{4}$	$6\frac{5}{8}$	Patience	\$16.70
6 x 48 Inches}	12	$1\frac{3}{4}$	5	$\frac{3}{4}$	$7\frac{1}{4}$	Patriot	14.90

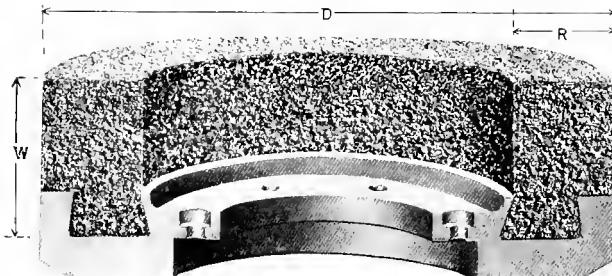


MACHINE	D	T	H	R	CODE	LIST PRICE
4 x 30 Inches}	12	1	5		Patron	9.50
6 x 38 Inches}	12	$\frac{3}{4}$	5		Patronage	7.80
	12	$\frac{1}{2}$	5		Patroness	6.00

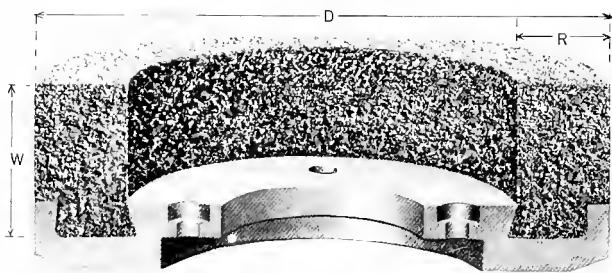


MACHINE	D	W	H	R	B	Y	CODE	LIST PRICE
Plain and Vertical Surface Gr.	12	4	$8\frac{3}{8}$	$1\frac{1}{4}$	$\frac{1}{2}$	$1\frac{13}{16}$	Patristic	27.30
" " " "	14	4	$10\frac{3}{8}$	$1\frac{1}{4}$	$\frac{1}{2}$	$1\frac{13}{16}$	Pathway	34.20
Vertical Surface Gr.	22	4	$17\frac{3}{8}$	$1\frac{3}{4}$	$\frac{1}{2}$	$2\frac{5}{8}$	Pathflies	78.35
" " "	30	$7\frac{3}{8}$	24	2	1	$2\frac{3}{8}$	Pathless	237.25

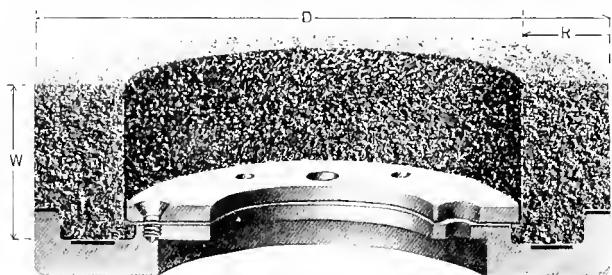
Wheels for Sellers Grinding Machines



MACHINE 1 Drill Grinder	D 14	W $3\frac{3}{4}$	R $2\frac{1}{2}$	CODE Sculptor	LIST PRICE \$37.45
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2 Drill Grinder	D 8	W $2\frac{1}{4}$	R $1\frac{1}{4}$	CODE Seclude	LIST PRICE 9.45
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2 Drill Grinder (wheel only)	D 8	W $2\frac{1}{4}$	R $1\frac{1}{4}$	CODE Secondary	LIST PRICE 9.45
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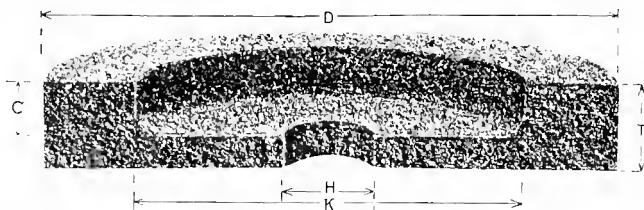
Prices on Iron Backs and Clamp Centers for above furnished upon request.

Wheels for Sellers Grinding Machines
 (Continued)

	D	T	H	CODE	LIST PRICE
1 Tool Grinder (special)	24	2 $\frac{3}{4}$	4	Sedan	\$78.00
1 Tool Grinder	24	2 $\frac{3}{4}$	4	Secluding	78.00
1 Tool Grinder (wheel only)	24	2 $\frac{3}{4}$	4	Seconding	78.00
2 Tool Grinder	15	1 $\frac{3}{8}$		Seclusion	20.50
2 Tool Grinder (wheel only)	15	1 $\frac{3}{8}$		Sedition	20.50

Prices for Iron Centers and Clamp Centers furnished upon request.

Wheels for Worcester Twist Drill Grinding Machines



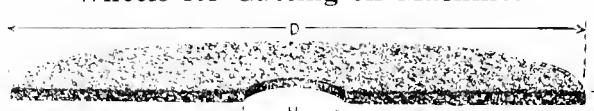
MACHINE	D	T	H	C	K	CODE	LIST PRICE
0 and 1	9 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	7 $\frac{7}{8}$	6 $\frac{1}{2}$	Winding	\$10.20
1 (Wet)	12 $\frac{3}{4}$	2 $\frac{1}{4}$	8	1 $\frac{1}{8}$	9 $\frac{1}{2}$	Winkingly	23.50
2	6	1 $\frac{1}{2}$	1 $\frac{1}{8}$	3 $\frac{3}{8}$	3 $\frac{3}{4}$	Wisdom	3.90
3	4	1 $\frac{13}{16}$	1 $\frac{1}{2}$	5 $\frac{5}{16}$	2 $\frac{1}{2}$	Witherbrand	1.95
00 (Wet)	15 $\frac{5}{8}$	3	1	1 $\frac{1}{4}$	8 $\frac{1}{4}$	Wittily	38.30

MACHINE	D	T	H	CODE	LIST PRICE
0, 1 and 1 (Wet) (Point Thinning Wheel)	8	5 $\frac{5}{16}$	1 $\frac{1}{2}$	Winsome	3.55
2	"	6	4 $\frac{1}{4}$	Wisp	1.90
3	"	3 $\frac{3}{8}$	9 $\frac{9}{16}$	Witted	1.10
00 (Wet)	12	3 $\frac{3}{8}$	1 $\frac{1}{2}$	Wizened	6.00

MACHINE	D	W	H	R	CODE	LIST PRICE
0 and 1	10	1 $\frac{3}{4}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Witticism	11.50

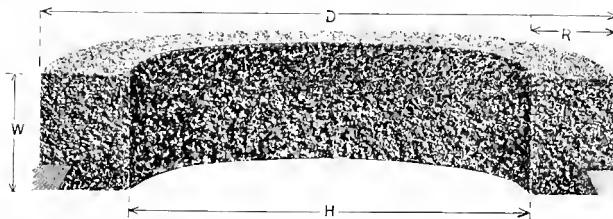
Price on Iron Back furnished upon request

Wheels for Cutting-off Machines

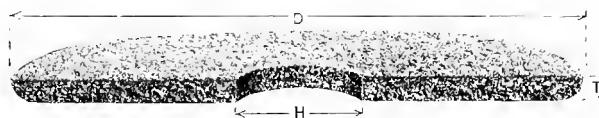


MACHINE	D	T	H	CODE	LIST PRICE
Nutter-Barnes Co.	12	3 $\frac{3}{8}$	1	Noiseless	4.20
Slack Mfg. Co.	12	3 $\frac{3}{8}$	1	Slacken	4.20
Matson Mach. Tool Co.	12	3 $\frac{3}{8}$	3	Matting	4.20
Peters	12	9 $\frac{9}{16}$	4 $\frac{1}{4}$	Pencoir	4.20
Peters	8	1 $\frac{1}{8}$	5 $\frac{1}{2}$	Penerraft	2.70
Racine	12	3 $\frac{3}{8}$	5	Ramapo	4.20

Wheels for American Drill Grinders

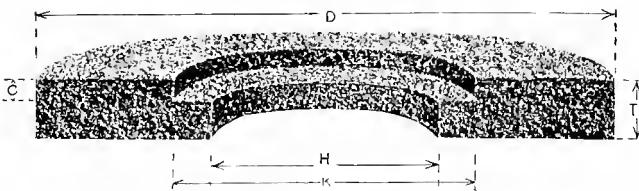


MACHINE (La Salle Mach. and Tool Co.)	D	W	H	R	CODE	LIST PRICE
American Drill Grinder	8 $\frac{7}{16}$	1 $\frac{3}{4}$	6	1 $\frac{7}{32}$	Hornet	\$89.50
Special Threaded Bushing for above, 50 cents net						



(La Salle Mach. and Tool Co.)	D	T	H			
American Drill Grinder						
Point Thinning Wheel	7	1	1 $\frac{1}{2}$	Hornpipe		2.30

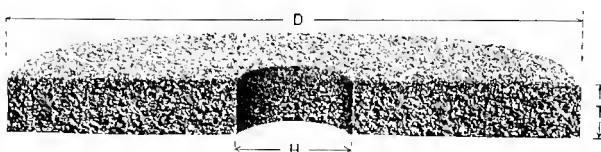
Wheels for Heald Grinding Machines



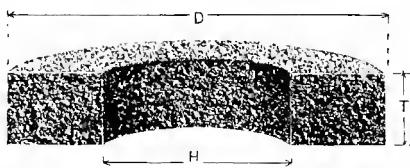
	SHAPE	D	T	H	C	K		
Ring Grinder	16	7	1 $\frac{1}{2}$	2	1 $\frac{1}{8}$	4	Horoscope	2.95
" "	17	8	2 $\frac{1}{2}$	2	1 $\frac{1}{8}$	4	Horsehide	3.55
" "	18	9	2 $\frac{1}{2}$	2	1 $\frac{1}{8}$	5 $\frac{1}{8}$	Horseshoe	5.20
Cylinder Grinder	23	3 $\frac{1}{2}$	4 $\frac{1}{2}$	1 $\frac{1}{4}$	1 $\frac{1}{16}$	2 $\frac{5}{16}$	Hothouse	1.65
" "	27	4	3 $\frac{1}{2}$	1 $\frac{1}{4}$	1 $\frac{5}{16}$	2 $\frac{5}{16}$	Hotbed	1.65

Wheels for Heald Grinding Machines

(Continued)

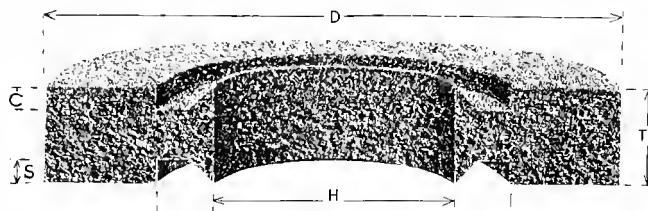


MACHINE	SHAPE	D	T	H	CODE	LIST PRICE
Rotary Surface Gr.	44	14	1 1/4	5	Heapest	\$14.20

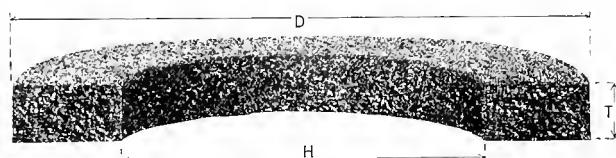


INTERNAL GRINDER	SHAPE	D	T	H	CODE	LIST PRICE
" "	30	3	1/2	7/8	Health	1.00
" "	31	2 1/2	1/2	7/8	Heave	1.00
" "	32	2	3/8	3/8	Heap	.75
" "	33	1 1/2	3/8	3/8	Heat	.75
" "	34	1	3/8	3/8	Heavy	.50
" "	35	1	3/8	1/4	Hearse	.50
" "	36	3/4	3/8	1/4	Heart	.50
" "	37	5/8	3/8	3/16	Hearty	.50
" "	38	7/16	5/16	1/8	Heath	.50
" "	39	1 1/2	3/8	1/4	Heathen	.75
" "	40	2	1/2	3/8	Hearsay	.75
" "	41	1 1/2	1/2	3/8	Heartache	.75
" "	42	1	1/2	3/8	Hearths	.50
" "	45	3/4	5/8	1/4	Heartily	.60
" "	46	1	5/8	1/4	Heartless	.60
" "	47	1	5/8	3/8	Heartlet	.60
" "	48	1 1/2	5/8	3/8	Heartsome	.90
" "	49	2	5/8	3/8	Heatheny	.90
" "	50	2 1/2	3/4	7/8	Heathwort	1.20
" "	51	3	3/4	7/8	Heatingly	1.20
" "	52	1 1/2	3/4	3/8	Heavens	.90
" "	53	2	3/4	3/8	Heaumerie	.90
" "	54	1	3/4	3/8	Heavenly	.60
" "	55	1 1/4	3/4	3/8	Heaviness	.90

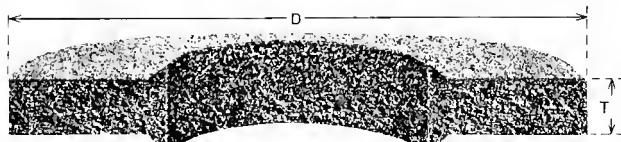
Wheels for Springfield Grinding Machines



MACHINE	D	T	H	C	S	K	CODE	LIST	PRICE
O Tool Grinding	14	2 $\frac{1}{2}$	6	3 $\frac{3}{8}$	3 $\frac{3}{8}$	8 $\frac{1}{2}$	Spaceless	\$25.80	
1A "	20	3	9	3 $\frac{3}{8}$	3 $\frac{3}{8}$	11 $\frac{1}{4}$	Sparkle	58.00	
2 "	26	4	12	4 $\frac{1}{2}$	4 $\frac{1}{2}$	15	Spangle	122.70	
4 and 4 $\frac{1}{2}$ "	30	4	14	4 $\frac{1}{2}$	4 $\frac{1}{2}$	15	Sparkish	160.75	
Double Open Side Surface Grinding	14	4 $\frac{1}{2}$	6	3 $\frac{3}{8}$	3 $\frac{3}{8}$	8 $\frac{1}{2}$	Spectre	44.80	
15-Inch Oscillator	20	7 $\frac{1}{2}$	9	3 $\frac{3}{8}$	3 $\frac{3}{8}$	11 $\frac{1}{4}$	Spigot	142.50	
24 " "	20	12	9	3 $\frac{3}{8}$	3 $\frac{3}{8}$	11 $\frac{1}{4}$	Spiker	228.00	
30 " "	20	15	9	3 $\frac{3}{8}$	3 $\frac{3}{8}$	11 $\frac{1}{4}$	Spill	285.00	

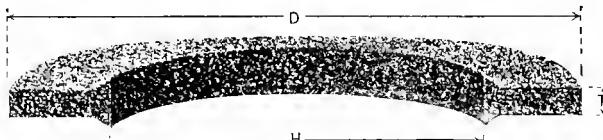


	D	T	H		
1, 1 $\frac{1}{2}$ and 3 Tool	20	3	9	Spacious	58.00
2A Tool	26	4	12	Sparkling	122.70
6 " "	36	4	24	Spasm	205.35
1, 2 and 3 Universal Upright Surface	9	$\frac{1}{2}$	5	Spatula	4.15
	19 $\frac{7}{8}$	6	8	Speculate	114.00

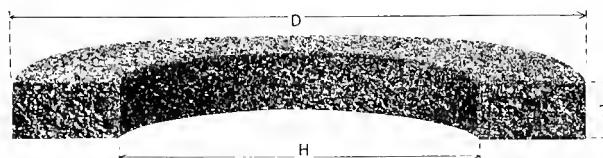


	D	T	H		
2, 2 $\frac{1}{2}$ and 7 Tool	26	3	12	Sparer	93.05
5 and 8 Tool	36	4	24	Sparrow	205.35
4 Universal Tool	16	1	6	Spatter	14.60
Pattern-'92 Knife	36	2	24	Spavin	104.35
Knife	26	$1\frac{1}{2}$	12	Speaker	48.15
1 and 3 Roll Grinding	16	$1\frac{1}{2}$	6	Specific	20.50
2 Roll Grinding	14	$1\frac{1}{2}$	6	Specimen	16.50
4 and 6 Surface	14	2	6	Speckle	21.20
4 Car Wheel	18	$1\frac{1}{2}$	8	Spercuile	25.10
0, 1, 2 and 4 Car Wheel	18	$1\frac{1}{2}$	$2\frac{1}{2}$	Spherical	25.10
New No. 4 Car Wheel	18	$2\frac{1}{2}$	$2\frac{1}{2}$	Sphericity	39.80

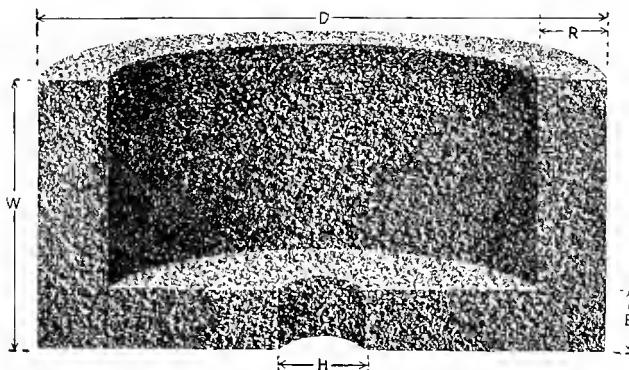
Wheels for Bridgeport and Safety Grinding Machines



MACHINE	D	T	H	CODE	LIST PRICE
Safety No. 2½ Tool	20	2½	6	Samlet	\$48.70
" " 3½ "	16	2½	6	Samphire	32.40
" " 4 "	24	3	9	Sampler	85.00
Bridgeport and Safety No. 5 Tool	36	4	24	Brisket	205.35
Safety No. 7 Tool	48	4	30	Sanable	376.00
Safety Automatic Knife	26	1½	9	Sanability	52.50
Bridgeport Knife	26	1½	12	Bureau	48.15
Bridgeport and Safety Heavy Knife	36	2	24	Burial	104.35

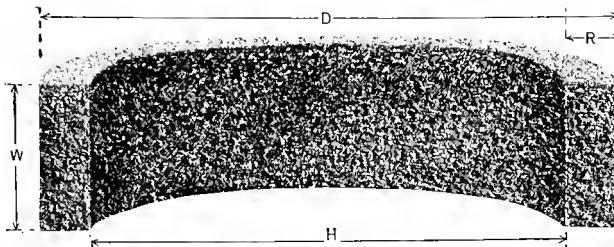


	D	T	H		
Bridgeport No. 3 Tool	20	2½	9	Breakfast	48.70
" " 4 "	26	3	12	Breasted	93.05
" " 5 "	36	4	24	Brimful	205.35
" " 6 "	42	4	26	Bulrush	286.65
" Heavy Knife	36	2	24	Burgess	104.35

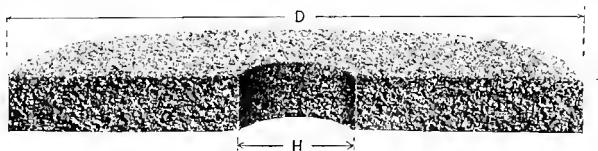


	D	W	H	R	B	
Bridgeport Medium Cup Wheel Knife	20	8	4	2	1½	Bungle
" Heavy Cup Wheel Knife	24	8	3	2	1½	Burdock
" Guide Bar	30	8	3	2	1¾	Burly
" "	16	8	2	2	1½	Buriles
" "	16	5	1½	2	1	Burilo

Wheels for Diamond Grinding Machines

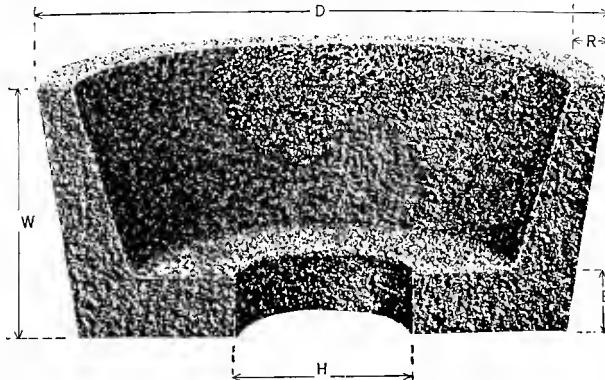


MACHINE	D	W	H	R	CODE	LIST PRICE
Face and Angle	12	3	10	1	Dialect	\$23.80
Car Box	22	4½	19½	1¼	Diamond	79.35
Knife and Face	14	3½	12	1	Dialogue	27.75
Auto. Knife Gr. for long knives	18	4	15	1½	Diaclose	45.00
84-Inch Heavy Guide Bar	30	6	26	2	Diatonis	161.50



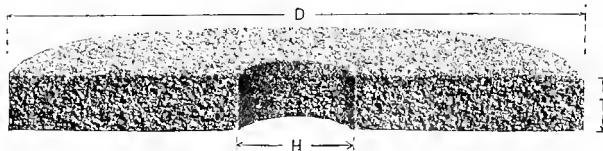
	D	T	H			
1 Water Tool	14	2	1½		Diabeles	21.20
2 " "	20	2½	7		Diacritic	48.70
3 " "	24	3½	10		Diadem	99.00
4 " "	30	4	16		Diagram	157.25
5 " "	36	4	21		Dial	217.65

Wheels for Wardwell Knife and Saw Grinding Machines

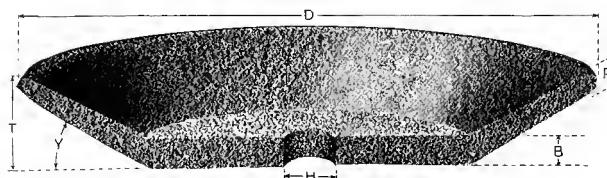


SHAPE	D	W	H	R	B	
Wardwell 7	3	2	½	5/16	5/16	Warbling 2.30

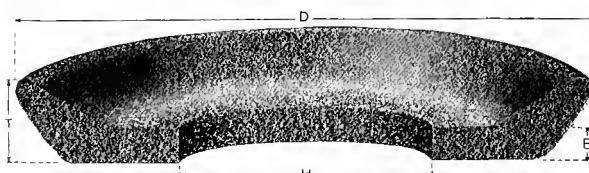
Wheels for Cochrane-Bly Grinding Machines



MACHINE	D	T	H	CODE	LIST PRICE
Auto. Saw Sharpener No. 10	$\frac{4}{5}$	$\frac{3}{8}$	$\frac{3}{8}$	Gorge	\$1.40
" " 11	$\frac{5}{6}$	$\frac{1}{2}$	$\frac{1}{2}$	Gentry	1.90

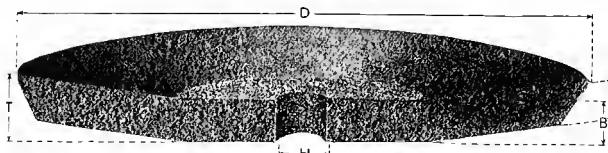


MACHINE	D	T	H	B	Y	R	CODE	LIST PRICE
Auto. Saw Sharpener No. 11	S	$1\frac{3}{6}$	$\frac{3}{4}$	$\frac{5}{16}$	30°	$\frac{7}{32}$	Genial	6.10
" " 11	S	$1\frac{9}{32}$	$\frac{3}{4}$	$\frac{1}{2}$	30°	$\frac{9}{32}$	Genius	6.90



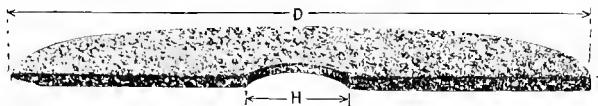
MACHINE	D	T	H	B	CODE	LIST PRICE
Auto. Saw Sharpener No. 10	6	$1\frac{3}{16}$	$2\frac{3}{4}$	$\frac{5}{16}$	Geology	3.40

Wheel for Nutter & Barnes Grinding Machine



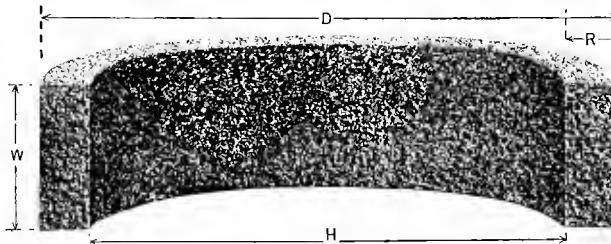
MACHINE	D	T	H	B	Y	CODE	LIST PRICE
Metal Saw Grinder	9	$\frac{15}{16}$	$\frac{13}{16}$	$\frac{5}{8}$	52°	Nutbar	6.30

Wheels for Wardwell Knife and Saw Grinding Machines

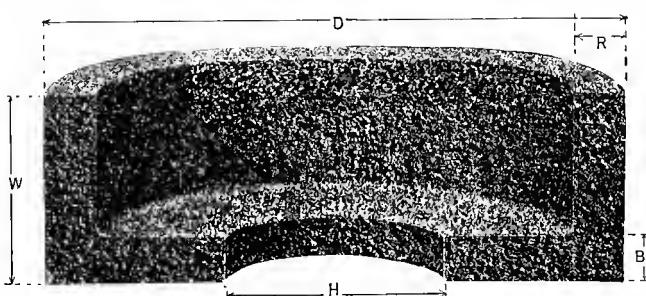


MACHINE	D	T	H	CODE	LIST PRICE
Wardwell 1	8	$\frac{1}{3}\frac{1}{2}$	$\frac{3}{4}$	Warblets	\$2.70
" 2	8	$\frac{1}{3}\frac{1}{6}$	$\frac{4}{3}$	Wappato	2.70
" 3	8	$\frac{3}{3}\frac{2}{3}$	$\frac{4}{3}$	Wappeaus	2.70
" 4	8	$\frac{1}{3}\frac{1}{4}$	$\frac{4}{3}$	Wappen	2.70
" 5	8	$\frac{1}{2}$	$\frac{4}{3}$	Warble	3.55
" 6	8	1	1	Warandeur	5.20

Wheels for Springfield Grinding Machines

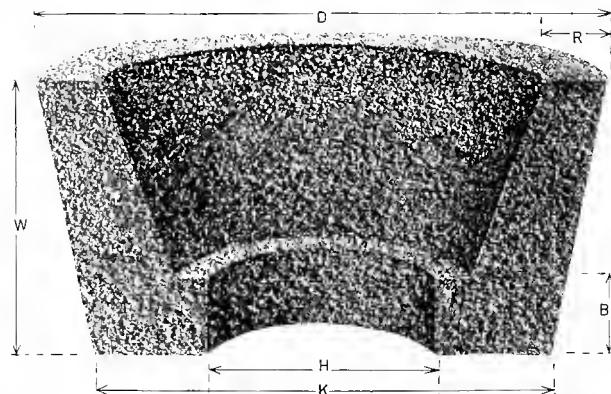


	D	W	H	R		
25 End Grinding and Four Sided Surfacer	$19\frac{7}{8}$	5	$15\frac{7}{8}$	2	Spelling	67.50
Mining Car Surfacer	$15\frac{7}{8}$	6	$11\frac{7}{8}$	2	Spectrum	54.45
19 Cup Wheel	$11\frac{7}{8}$	5	$8\frac{7}{8}$	$1\frac{1}{2}$	Spender	28.00
4½ Chuck	$4\frac{9}{16}$	3	$3\frac{1}{4}$	$\frac{21}{32}$	Sphere	5.70
Double Cup Wheel	$7\frac{7}{8}$	4	$5\frac{7}{8}$	$1\frac{1}{4}$	Spider	15.40
No. 7 48-Inch Oscillator	16	15	6	5	Spilling	188.25

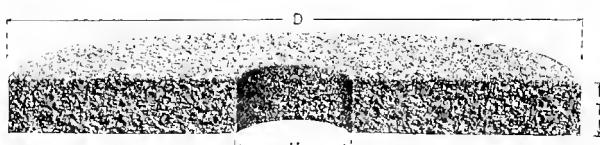


	D	W	H	R	B		
Guide Bar	30	8	23	2	1	Spinach	237.25
Vertical Gr. Planer	16	5	$11\frac{1}{2}$	$1\frac{1}{2}$	1	Spinal	51.25

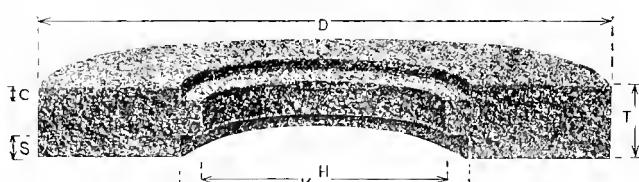
Wheels for Tool Grinding Machines



MACHINE	D	W	H	R	B	K	CODE	LIST PRICE
Gisholt	10	5½	4	1½	1½	8	Gimlet	\$29.55

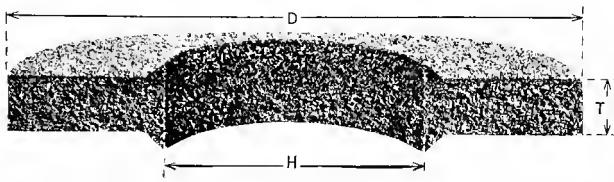


	D	T	H			
Barnes	24	2	1½	Banter	59.00	
Morse or Leland & Faulconer	24	1½	10	Lender	44.00	
Gould & Eberhardt	14	2	5	Gradual	21.20	
Blount	20	2½	9	Blomary	48.70	
Ransom	20	1½	10	Ramhead	30.50	

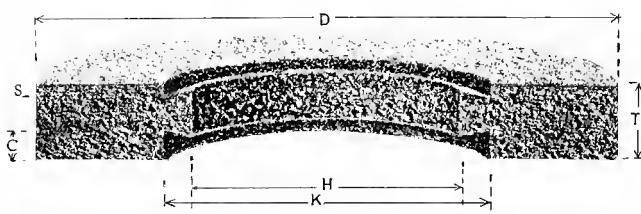


	D	T	H	S	C	K		
Ransom	24	3	10	3½	¾	12½	Rancho	85.00

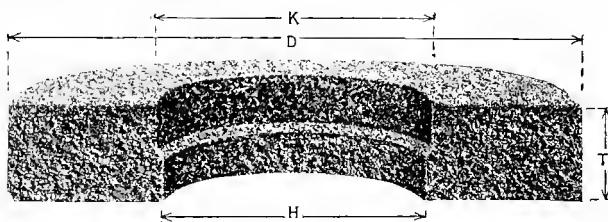
Wheels for Tool Grinding Machines



	D	T	H	CODE	LIST PRICE
Whitney (Taylor & Fenn)	20	2 $\frac{1}{2}$	9	Whisper	\$48.70
Chicago	16	1 $\frac{1}{2}$	7	Chink	20.50
"	24	2	9	Chipping	59.00
Taylor No. 1	33	3 $\frac{1}{2}$	20 $\frac{1}{2}$	Table	185.15

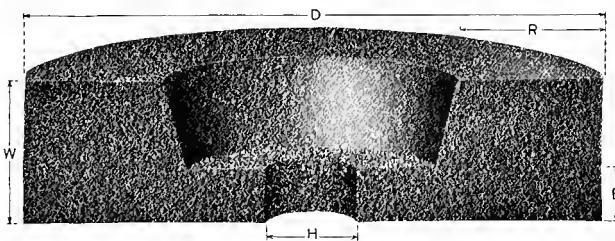


Taylor (old type)	D	T	H	S	C	K	Tandem	191.00
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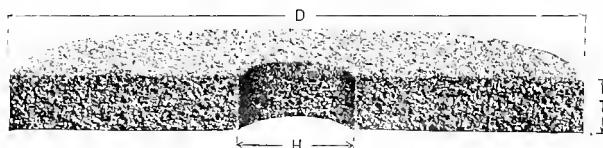
Gould & Eberhardt	D	T	H	K	Grained	47.20
"	18	3	8 $\frac{7}{8}$	9	Grampus	58.00
	20	3	8 $\frac{7}{8}$	9		

Wheels for Saw Tooth Grinding Machines



Tabor	D	W	H	B	R	Tablet	8.60
	8	2	1 $\frac{1}{4}$	$\frac{3}{4}$	2		

Wheels for Hisey-Wolf Electric Grinding Machines

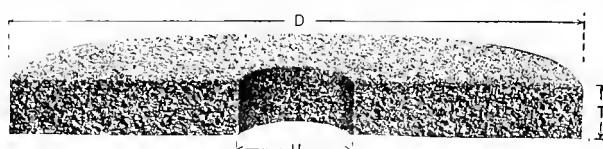


MACHINE	D	T	H	CODE	LIST PRICE
Hisey-Wolf	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Hilllock	\$.75
" "	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Hireling	1.90
" "	2	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Hirsute	.75
" "	8	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Hithermost	3.55
" "	10	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Hoariness	7.50
" "	3 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Hoarseness	1.65
" "	8	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Hollowness	4.40
" "	14	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Homage	16.50
" "	12	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Haoach	13.10
" "	6	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Haoussa	2.40
" "	3 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Hapalote	1.40

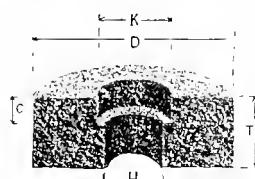
Wheels for U. S. Electrical Grinding Machines

U. S. Electrical	D	T	H	Code	List Price
" "	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Useo	.40
" "	2	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Useas	.75
" "	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Useab	1.20
" "	5	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Uslas	2.25
" "	6	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Uslet	2.40
" "	6	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Usluk	3.40
" "	8	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Usbel	4.40
" "	8	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Usbat	5.20
" "	8	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Usget	6.90
" "	8	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Uspal	8.60
" "	10	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Usnet	7.50
" "	12	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Uskus	4.20
" "	12	2	1 $\frac{1}{2}$	Usjabs	16.70
" "	14	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Ussam	16.50
" "	18	3	1 $\frac{1}{2}$	Ussal	47.20
" "	18	3	2	Usket	47.20
" "	24	4	2	Usral	113.00

Wheels for Wisconsin Electric Grinding Machines

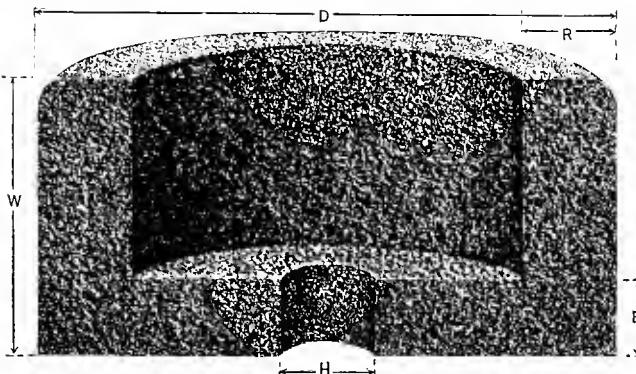


Dumore	D	T	H	Dual	List Price
"	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Dubious	1.00
	4	1 $\frac{1}{2}$	1 $\frac{1}{2}$		1.40

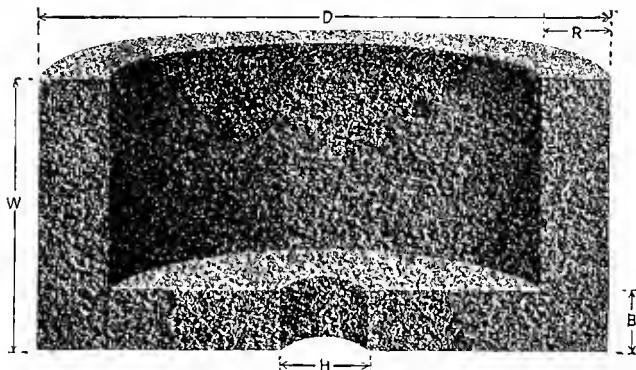


Dumore	D	T	H	C	K	Ducal	List Price
"	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.40	
"	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.40	
"	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.40	
"	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.40	
"	2 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	.40	

Wheels for Knife Grinding



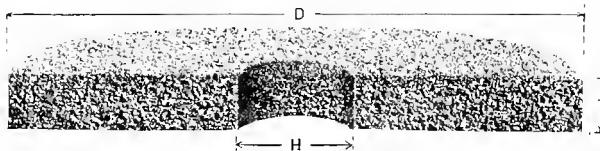
MACHINE	D	W	H	R	B	CODE	LIST PRICE
Buffalo	8	3½	1½	1½	1	Robust	\$13.70
"	12	4	2	1¾	1	Rotunda	27.30
"	10	3½	1½	1½	1	Roughshod	20.70
" Bench	6	3	1	1	1	Robbing	7.50



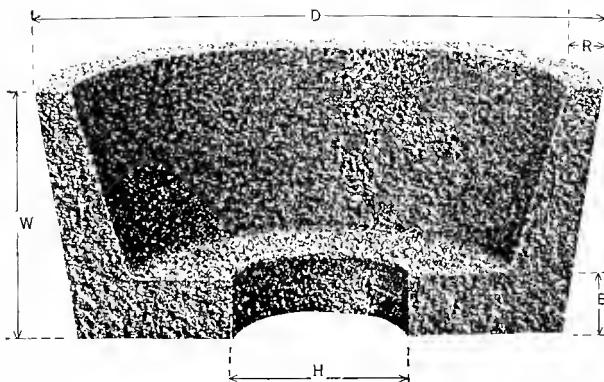
	D	W	H	R	B		
Am. W. W. McHy. Co.	8	4½	1	1	1	Amorous	18.90
Baldwin Tuthill & Bolton	12	4	1	1½	1	Bandit	27.30
" " "	8	3½	1	1¾	¾	Bandy	13.70
" " " "	6	3	1	1¾	¾	Baneful	7.50
Capital	14	7	1¾	1½	1⅛	Capon	52.60
J. A. Fay & Egan	8	4½	1½	1	1	Fardel	18.90
Northampton	9	4	3¾	1	¾	Nimble	18.25
Hanchett	8	3½	1	1	1	Handicap	13.70
"	10	4	1	1	1	Handkerchief	21.00
"	12	4	1	1	1	Handspike	25.50

Wheels for Knife Grinding

(Continued)

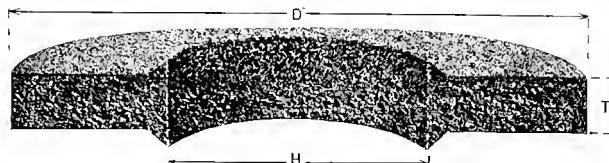


MACHINE	D	T	H	CODE	LIST PRICE
Am. W. W. Mch. Co.	4	1	$\frac{3}{4}$	Amorphe	\$1.95
" " "	6	$\frac{3}{4}$	$\frac{3}{4}$	Ameriole	2.90
" " "	22	$1\frac{1}{2}$	$1\frac{3}{4}$	Amoret	36.70
" " "	26	$1\frac{1}{2}$	15	Amollir	47.00
Baldwin, Tuthill & Bolton	26	$1\frac{1}{2}$	$1\frac{3}{4}$	Banging	52.50
Defiance Mch. Wks.	22	$1\frac{1}{2}$	2	Devine	36.70
J. A. Fay & Egan	16	$1\frac{1}{2}$	$1\frac{7}{16}$	Faro	11.60
" " "	24	$1\frac{1}{2}$	10	Farrago	44.00
Glen Cove	26	$1\frac{1}{2}$	15	Gamoll	47.00
Hanchett	8	$1\frac{1}{2}$	1	Hanche	3.55
"	26	$1\frac{1}{2}$	2	Hankel	52.50
Seybold	30	$1\frac{1}{2}$	16	Sequel	52.15
"	30	$1\frac{1}{2}$	16	Sequence	61.15
Williamsport	22	$1\frac{1}{2}$	$1\frac{3}{4}$	Wamoret	36.70
S. A. Woods	26	$1\frac{1}{2}$	6	Wood sorrel	52.50
Yates (Berlin)	4	$\frac{3}{4}$	$\frac{1}{2}$	Yacht	1.40

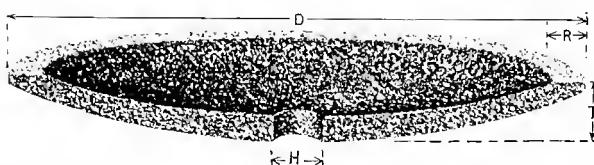


	D	W	H	R	B	
S. A. Woods (No. 227 Side Head Gr.)	6	$2\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{3}{8}$	Woodstack
Am. W. W. Mch. Co.	6	$2\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{3}{8}$	Woodstack
J. A. Fay & Egan	6	$1\frac{1}{2}$	$1\frac{1}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	Farina

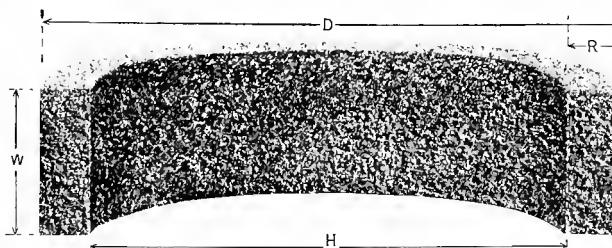
Wheels for Knife Grinding (Continued)



MACHINE	D	T	H	CODE	LIST PRICE
Yates (Berlin)	26	$1\frac{1}{2}$	12	Yachting	\$18.15

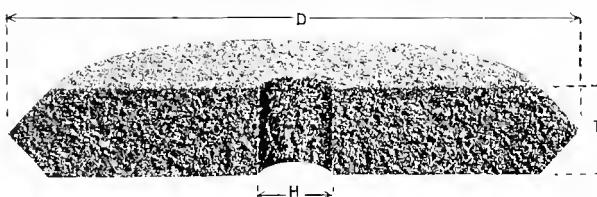


Yates (Berlin)	D	T	H	Yater	7.80
	8	$\frac{9}{16}$	1		



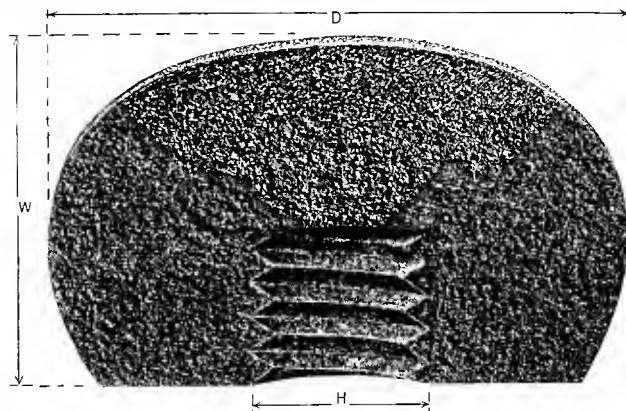
Defiance Mch. Wks.	D	W	H	R	Devil	28.00
	12	5	$9\frac{3}{4}$	$1\frac{5}{16}$		

Wheels for Hollow Ware Grinding

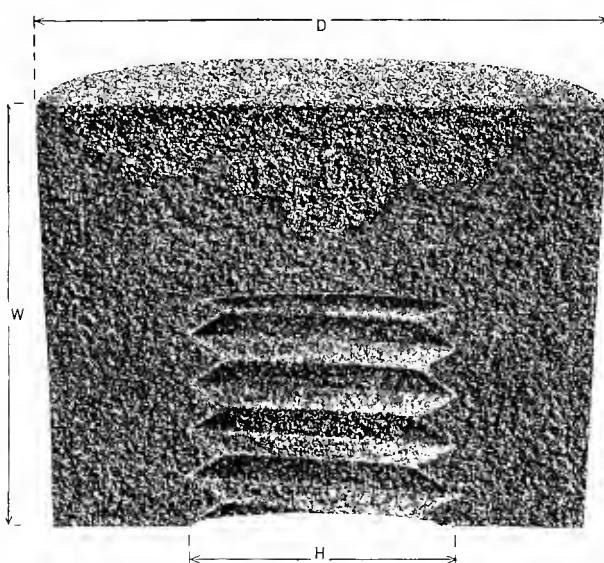


SHAPE	D	T	H		
Skillet or Spider Wheel	8	$1\frac{1}{4}$	1	Hollystone	6.10

Wheels for Hollow Ware Grinding
 (Continued)



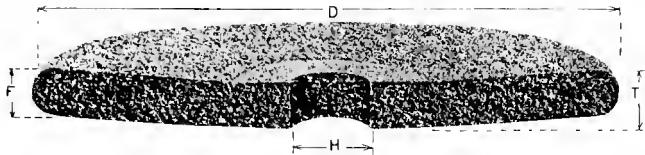
SHAPE	D	W	H	CODE	LIST PRICE
Round Pot Ball	6	4 $\frac{1}{4}$	1 $\frac{3}{4}$	Holdfast	\$10.10



Flat Bottom Pot Ball	D 5 $\frac{1}{2}$	W 3	H 1 $\frac{3}{4}$	Hollow	7.50
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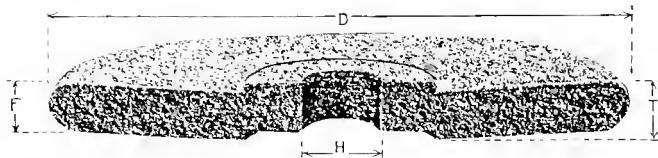
Grinding wheels for hollow ware grinding are furnished in a great many different sizes and shapes, similar to above cuts, depending on shape of kettle or spider.

Wheels for Saw Gumming



SHAPE	No.	D	T & F	H	CODE	LIST PRICE
Saucer	1	12	($\frac{3}{4}$ — $\frac{1}{4}$)	—	Saruch	\$7.80
	2	12	($\frac{7}{8}$ — $\frac{3}{8}$)	—	Sarzia	9.50
	3	12	($1\frac{1}{2}$ — $\frac{1}{2}$)	—	Sasapin	9.50
	4	12	($1\frac{1}{8}$ — $\frac{5}{8}$)	—	Sarcilis	11.30
	5	12	($1\frac{1}{8}$ — $\frac{4}{8}$)	—	Sarcianus	11.30
	6	12	($1\frac{3}{8}$ — $\frac{7}{8}$)	—	Sasherries	13.10
	7	12	($1\frac{1}{8}$ — 1)	—	Sashoon	13.10
	8	12	($1\frac{5}{8}$ — $1\frac{1}{8}$)	—	Sason	14.90
	9	12	($1\frac{1}{4}$ — $1\frac{1}{4}$)	—	Saspries	14.90
	10	10	($\frac{5}{8}$ — $\frac{1}{4}$)	—	Sassaby	6.20
	11	10	($\frac{3}{8}$ — $\frac{3}{8}$)	—	Sassatile	6.20
	12	10	($\frac{7}{8}$ — $\frac{1}{2}$)	—	Sarcasmo	7.50
	13	10	($1\frac{1}{8}$ — $\frac{5}{8}$)	—	Sarceaux	7.50
	14	10	($1\frac{1}{8}$ — $\frac{3}{4}$)	—	Sassefras	8.90
	15	10	($1\frac{1}{8}$ — $\frac{8}{8}$)	—	Sassello	8.90
	16	10	($1\frac{3}{8}$ — 1)	—	Sassers	10.20
	17	10	($1\frac{1}{2}$ — $1\frac{1}{8}$)	—	Sasseur	10.20
	18	10	($1\frac{5}{8}$ — $1\frac{1}{4}$)	—	Sassifica	11.50
	19	8	($\frac{1}{2}$ — $\frac{1}{4}$)	—	Sassilus	3.55
	20	8	($\frac{5}{8}$ — $\frac{3}{8}$)	—	Sareasmes	4.40
	21	8	($\frac{3}{8}$ — $\frac{1}{2}$)	—	Sarcanto	4.40
	22	8	($\frac{7}{8}$ — $\frac{5}{8}$)	—	Sassoire	5.20
	23	8	($1\frac{1}{8}$ — $\frac{3}{8}$)	—	Sassorol	5.20
	24	8	($1\frac{1}{8}$ — $\frac{7}{8}$)	—	Sastreria	6.10
	25	8	($1\frac{1}{8}$ — 1)	—	Satagimus	6.10
	26	8	($1\frac{3}{8}$ — $1\frac{1}{8}$)	—	Satagium	6.90
	27	8	($1\frac{1}{2}$ — $1\frac{1}{4}$)	—	Satagunt	6.90
	28	6	($\frac{1}{2}$ — $\frac{1}{4}$)	—	Satanaz	2.40
	29	6	($\frac{5}{8}$ — $\frac{3}{8}$)	—	Sarcanthe	2.90
	30	6	($\frac{3}{4}$ — $\frac{1}{2}$)	—	Sarcal	2.90
	31	6	($\frac{7}{8}$ — $\frac{5}{8}$)	—	Sataniele	3.40
	32	6	($1\frac{1}{4}$ — $\frac{3}{4}$)	—	Satanico	3.40
	33	6	($1\frac{1}{8}$ — $\frac{7}{8}$)	—	Sataniser	3.90
	34	6	($1\frac{1}{4}$ — 1)	—	Satanism	3.90
	35	6	($1\frac{3}{8}$ — $1\frac{1}{8}$)	—	Satansch	4.45
	36	6	($1\frac{1}{2}$ — $1\frac{1}{4}$)	—	Sataspes	4.45

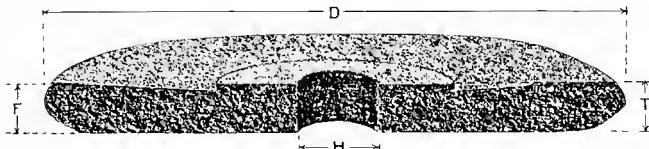
Wheels for Saw Gumming



SHAPE	No.	D	T & F	H	CODE	LIST PRICE
Churchill	37	12	($\frac{5}{16}$ — $\frac{1}{16}$)	—	Christmas	\$6.00
	38	12	($\frac{3}{8}$ — $\frac{5}{16}$)	—	Christmon	6.00
	39	12	($\frac{7}{16}$ — $\frac{3}{16}$)	—	Chromate	6.00
	40	12	($\frac{1}{2}$ — $\frac{7}{16}$)	—	Chrome	6.00
	41	12	($\frac{5}{8}$ — $\frac{1}{2}$)	—	Chromibus	7.80
	42	12	($\frac{11}{16}$ — $\frac{9}{16}$)	—	Chromion	7.80
	43	12	($\frac{3}{4}$ — $\frac{5}{8}$)	—	Churchship	7.80
	44	12	($\frac{13}{16}$ — $\frac{11}{16}$)	—	Chromisme	9.50
	45	12	($\frac{5}{8}$ — $\frac{3}{4}$)	—	Churlish	9.50
	46	12	($\frac{15}{16}$ — $\frac{13}{16}$)	—	Chromoere	9.50
	47	12	($1\frac{7}{8}$)	—	Chromogen	9.50
	48	12	($1\frac{1}{16}$ — $1\frac{5}{16}$)	—	Chromule	11.30
	49	12	($1\frac{1}{16}$ —1)	—	Chronicles	11.30
	50	10	($\frac{5}{16}$ —1)	—	Chronicon	4.90
	51	10	($\frac{3}{8}$ — $\frac{5}{16}$)	—	Chronies	4.90
	52	10	($\frac{7}{16}$ — $\frac{3}{8}$)	—	Chronio	4.90
	53	10	($\frac{2}{5}$ — $\frac{7}{16}$)	—	Chronique	4.90
	54	10	($\frac{5}{8}$ — $\frac{2}{5}$)	—	Churchly	6.20
	55	10	($\frac{11}{16}$ — $\frac{9}{16}$)	—	Chrysa	6.20
	56	10	($\frac{3}{4}$ — $\frac{5}{8}$)	—	Churchman	6.20
	57	10	($\frac{13}{16}$ — $\frac{11}{16}$)	—	Chrysaore	7.50
	58	10	($\frac{5}{8}$ — $\frac{3}{4}$)	—	Chryseum	7.50
	59	10	($\frac{15}{16}$ — $\frac{13}{16}$)	—	Chrysidem	7.50
	60	10	($1\frac{7}{8}$)	—	Chrysole	7.50
	61	10	($1\frac{1}{16}$ — $1\frac{5}{16}$)	—	Chrysolite	8.90
	62	10	($1\frac{5}{8}$ —1)	—	Chryson	8.90
	63	8	($\frac{5}{16}$ — $\frac{1}{16}$)	—	Chrysonoe	3.55
	64	8	($\frac{3}{8}$ — $\frac{5}{16}$)	—	Chubbed	3.55
	65	8	($\frac{7}{16}$ — $\frac{3}{8}$)	—	Churchism	3.55
	66	8	($\frac{5}{8}$ — $\frac{7}{16}$)	—	Chucero	3.55
	67	8	($\frac{5}{8}$ — $\frac{1}{2}$)	—	Churching	4.40
	68	8	($\frac{11}{16}$ — $\frac{9}{16}$)	—	Churchear	4.40
	69	8	($\frac{3}{4}$ — $\frac{5}{8}$)	—	Chuchotes	4.40
	70	8	($\frac{13}{16}$ — $\frac{11}{16}$)	—	Chucklest	5.20
	71	8	($\frac{5}{8}$ — $\frac{3}{4}$)	—	Chuferos	5.20
	72	8	($\frac{15}{16}$ — $\frac{13}{16}$)	—	Chuinc	5.20
	73	8	($1\frac{7}{8}$)	—	Chulan	5.20
	74	8	($1\frac{1}{16}$ — $1\frac{5}{16}$)	—	Chulice	6.10
	75	8	($1\frac{1}{8}$ —1)	—	Chulpe	6.10
	76	6	($\frac{7}{16}$ — $\frac{4}{16}$)	—	Chumar	2.40
	77	6	($\frac{3}{8}$ — $\frac{5}{16}$)	—	Chuckle	2.40
	78	6	($\frac{7}{16}$ — $\frac{3}{8}$)	—	Churched	2.40
	79	6	($\frac{1}{2}$ — $\frac{7}{16}$)	—	Chumbin	2.40
	80	6	($\frac{2}{5}$ — $\frac{1}{2}$)	—	Churchdom	2.90
	81	6	($\frac{11}{16}$ — $\frac{9}{16}$)	—	Chumbos	2.90

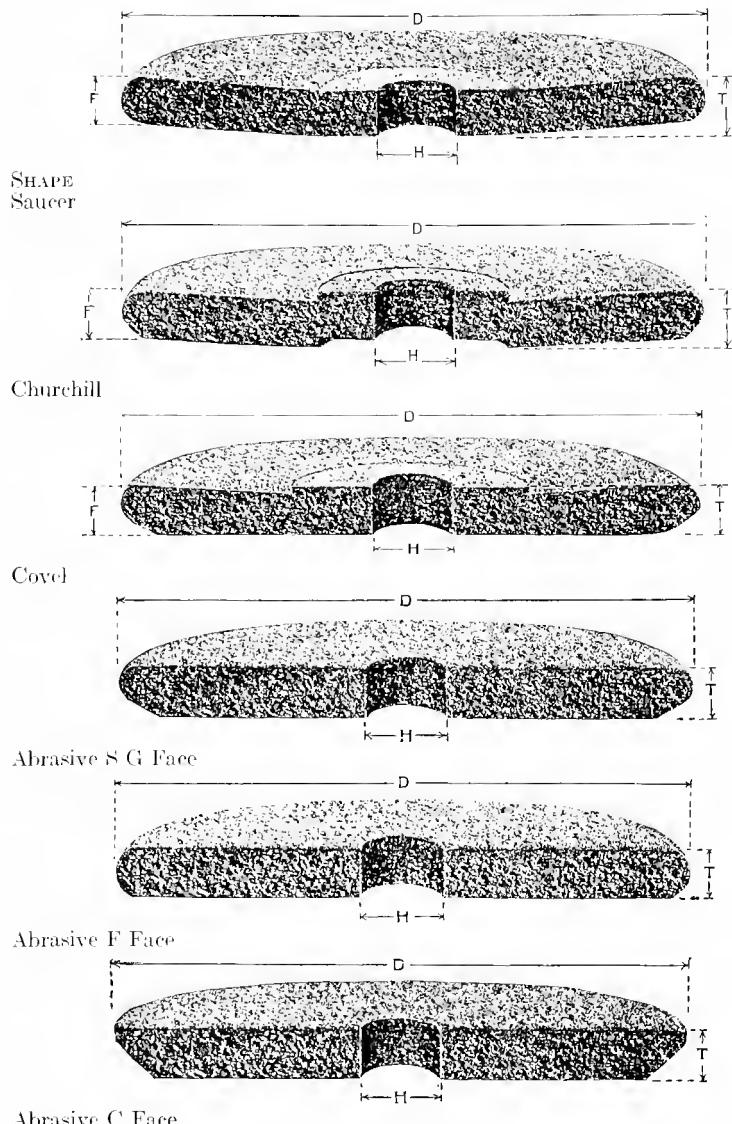
Wheels for Saw Gumming

SHAPE	No.	D	T & F	H	CODE	LIST PRICE
Churchill	82	6	($\frac{3}{4}$ — $\frac{5}{8}$)	—	Chumship	\$2.90
	83	6	($\frac{13}{16}$ — $\frac{11}{16}$)	—	Chunchos	3.40
	84	6	($\frac{7}{8}$ — $\frac{3}{4}$)	—	Chuncoa	3.40
	85	6	($\frac{15}{16}$ — $\frac{13}{16}$)	—	Chunos	3.40
	86	6	($\frac{1}{2}$ — $\frac{7}{8}$)	—	Chupeta	3.40
	87	6	($1\frac{1}{16}$ — $1\frac{5}{16}$)	—	Chupiri	3.90
	88	6	($1\frac{1}{8}$ —1)	—	Chupones	3.90

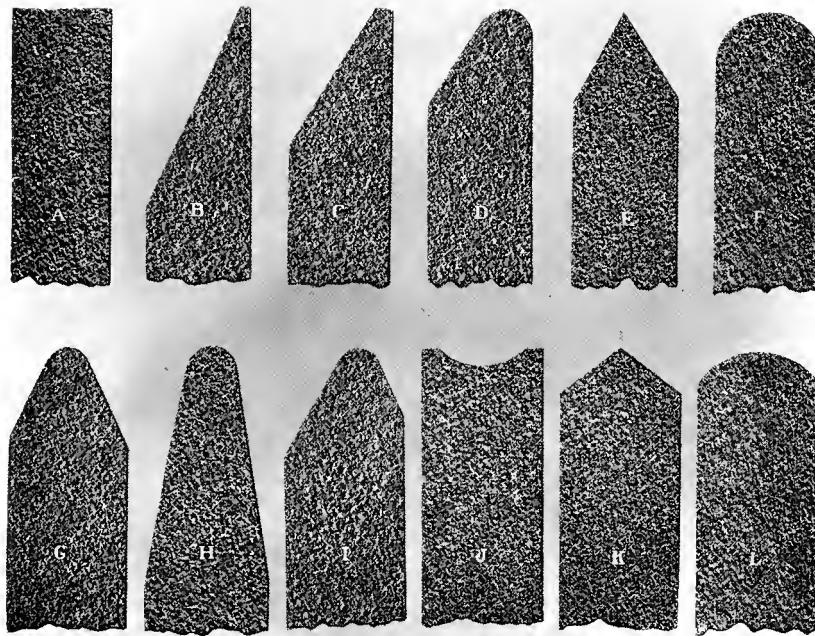


SHAPE	No.	D	T & F	H	CODE	LIST PRICE
Covel	89	12	($\frac{3}{8}$ — $\frac{3}{8}$)	—	Couriers	6.00
	90	12	($\frac{1}{2}$ — $\frac{1}{2}$)	—	Courir	6.00
	91	12	($\frac{5}{8}$ — $\frac{5}{8}$)	—	Covinaire	7.80
	92	12	($\frac{3}{8}$ — $\frac{3}{8}$)	—	Covinous	7.80
	93	12	($\frac{7}{8}$ — $\frac{7}{8}$)	—	Courrais	9.50
	94	12	(1—1)	—	Courriau	9.50
	95	12	($1\frac{1}{8}$ — $1\frac{1}{8}$)	—	Coursing	11.30
	96	12	($1\frac{1}{4}$ — $1\frac{1}{4}$)	—	Court	11.30
	97	10	($\frac{3}{8}$ — $\frac{3}{8}$)	—	Courteous	4.90
	98	10	($\frac{1}{2}$ — $\frac{1}{2}$)	—	Coviello	4.90
	99	10	($\frac{5}{8}$ — $\frac{5}{8}$)	—	Coviglio	6.20
	100	10	($\frac{3}{8}$ — $\frac{3}{8}$)	—	Courtesy	6.20
	101	10	($\frac{1}{2}$ — $\frac{1}{2}$)	—	Courtlike	7.50
	102	10	(1—1)	—	Courton	7.50
	103	10	($1\frac{1}{8}$ — $1\frac{1}{8}$)	—	Courtship	8.90
	104	10	($1\frac{1}{4}$ — $1\frac{1}{4}$)	—	Courumes	8.90
	105	8	($\frac{3}{8}$ — $\frac{3}{8}$)	—	Covets	3.55
	106	8	($\frac{1}{2}$ — $\frac{1}{2}$)	—	Covetous	3.55
	107	8	($\frac{5}{8}$ — $\frac{5}{8}$)	—	Cousapier	4.40
	108	8	($\frac{3}{8}$ — $\frac{3}{8}$)	—	Cousiner	4.40
	109	8	($\frac{1}{2}$ — $\frac{1}{2}$)	—	Cousinly	5.20
	110	8	(1—1)	—	Coussinet	5.20
	111	8	($1\frac{1}{8}$ — $1\frac{1}{8}$)	—	Cousson	6.10
	112	8	($1\frac{1}{4}$ — $1\frac{1}{4}$)	—	Coutaria	6.10
	113	6	($\frac{3}{8}$ — $\frac{3}{8}$)	—	Covetise	2.40
	114	6	($\frac{1}{2}$ — $\frac{1}{2}$)	—	Covetable	2.40
	115	6	($\frac{5}{8}$ — $\frac{5}{8}$)	—	Coutebar	2.90
	116	6	($\frac{3}{8}$ — $\frac{3}{8}$)	—	Coutele	2.90
	117	6	($\frac{7}{8}$ — $\frac{7}{8}$)	—	Coutha	3.40
	118	6	(1—1)	—	Couti	3.40
	119	6	($1\frac{1}{8}$ — $1\frac{1}{8}$)	—	Coutiau	3.90
	120	6	($1\frac{1}{4}$ — $1\frac{1}{4}$)	—	Coutitur	3.90

Wheels for Saw Gumming



For prices S G, F and C Faces of Saw Gumming Wheels see straight wheel list. When ordering specify the face desired.



Shapes of Wheel Faces

HERE are shown different shapes of faces frequently used in grinding wheels. The round and bevel-faced wheels are more particularly used for gumming and sharpening saws, grinding moulding cutters, etc.

In ordering give the letter of the diagram to show the shape of face or edge required.

We are always willing to turn the faces of wheels to any desired shape, and where any shapes other than the ones shown are needed, a sketch should accompany the order.

Where no shape of face is mentioned, we understand that a square-faced wheel is wanted.

Weights of Wheels

It is frequently desirable, especially for our foreign customers, to know the weights of wheels. The table below shows the approximate net weights, in pounds, of our wheels from 3 inches to 36 inches.

Diam. in Inches	THICKNESS IN INCHES									
	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4
3	.14	.22	.27	.40	.56	.85	1.14	1.40	1.70	
4	.25	.38	.50	.75	1.00	1.50	2.00	2.50	3.00	4.00
5	.38	.55	.70	.90	1.48	2.30	3.10	3.85	4.65	6.20
6	.58	.88	1.17	1.76	2.30	3.44	4.60	5.75	6.90	9.40
7	.80	1.25	1.65	2.50	3.35	5.10	7.20	8.36	10	13
8	1.08	1.57	2.25	3.35	4.40	6.70	8.90	11	13	17
9	1.33	1.90	2.65	4.00	5.30	7.90	11	13	15	21
10	1.66	2.70	3.40	5.00	6.80	9.85	14	17	22	27
12	2.40	3.75	4.85	7.50	9.70	15	19	25	30	38
14	3.20	4.70	6.40	9.66	13	20	26	33	38	52
16		6.12	8.15	12	17	26	34	43	51	68
18		11	16	22	33	44	55	66	87	
20			21	28	41	55	68	82	109	
22				33	49	65	82	98	131	
24				38	59	78	98	117	156	
26					69	92	115	138	184	
30						86	120	145	176	237
36						127	177	221	265	354

The above weights are of wheels made by the vitrified process, the process used in making more than 90 per cent of our wheels. To obtain weights of wheels made by the silicate or elastic process, add 20 per cent to the figures shown.

General Rule for Obtaining Weights of Wheels

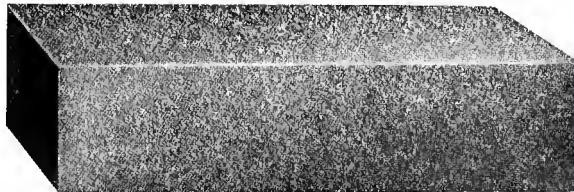
To obtain the weight of vitrified wheels: square the diameter, multiply by the thickness and divide by 15.

To obtain the weight of silicate wheels: square the diameter, multiply by the thickness and divide by 13.

Price List of Rubbing Bricks

Borolon

Electrolon



Subject to Discount

Size	Price per dozen	Size	Price per dozen
8 x 4 x 4	\$48.00	6 x 2 x 1	\$6.00
8 x 4 x 3	36.00	4 x 4 x 4	24.00
8 x 4 x 2	24.00	4 x 3 x 3	14.40
8 x 3 x 3	28.80	4 x 3 x 2	10.80
8 x 3 x 2	18.00	4 x 2 x 2	7.80
8 x 2 x 2	12.60	4 x 2 x 1	4.80
8 x 2 x 1	7.80	4 x 2 x $\frac{1}{2}$	3.60
6 x 3 x 3	21.60	4 x 1 x $\frac{1}{2}$	2.40
6 x 3 x 2	14.40	4 x 1 x $\frac{1}{4}$	2.40
6 x 2 x 2	10.80		

The above sizes are more commonly used for cleaning castings and other rough work. Bricks for such work are mostly made in coarse grain. We can, however, furnish them in any grain from the coarsest to the finest and in special sizes as well. They are not squared up and dressed, but are furnished just as they come from the kilns.

Price List of Electrolon Rubbing Bricks for Concrete Work

8 x 3 x 3 inches	per dozen, \$28.80
8 x 2 x 2 inches	per dozen, 12.60

Fluted bricks have been found to be satisfactory for the rubbing down of concrete. They are more efficient than sandstone and give much longer life. By having the flutes in the bricks a faster cutting action is produced and also allows a clearance for the material removed.

Bricks for this work are usually furnished in No. 20 Grit, Grade Q.

Sticks



Price List Subject to Discount

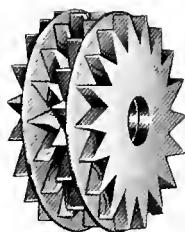
ROUND STICKS			TRIANGULAR STICKS			SQUARE STICKS		
Length in Inches	Diam	Price per Dozen	Length in Inches	Thick.	Price per Dozen	Length in Inches	Thick.	Price per Dozen
4	1	\$3.00	4	1	\$3.00	4	1	\$3.00
4	$\frac{3}{4}$	2.75	4	$\frac{3}{4}$	2.75	4	$\frac{3}{4}$	2.75
4	$\frac{5}{8}$	2.50	4	$\frac{5}{8}$	2.50	4	$\frac{5}{8}$	2.50
4	$\frac{1}{2}$	2.25	4	$\frac{1}{2}$	2.25	4	$\frac{1}{2}$	2.25
3	$\frac{3}{8}$	2.00	3	$\frac{3}{8}$	2.00	4	$\frac{3}{8}$	2.00
2	$\frac{1}{4}$	2.00	2	$\frac{1}{4}$	2.00	4	$\frac{1}{4}$	2.00

Sticks are furnished as they come from kilns. They are not squared and trued on rubbing beds.

Grinding Wheel Dressers

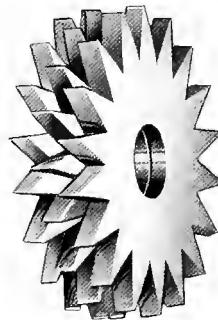


No. 1 Huntington Hooded Dresser



No. 1 Cutters

Tools for truing and dressing grinding wheels should be on hand and ready to use. It is very important that the grinding wheel should be kept true at all times.



No. 2 Cutters

No. 1 Huntington Hooded
No. 1 Cutters, .per set
No. 2 Hooded Dresser
No. 2 Cutters, .per set

Prices upon application



No. 2 Hooded Dresser

Telegraph and Cable Code

Ship at once	MACER
Ship at once by freight	MACAW
Ship at once by express	MADLY
Ship at once by boat	MADAM
Ship part by express, balance by freight	MADCAP
Ship us duplicate of last order at once by freight	MADEFY
Ship us duplicate of last order at once by express	MADDER
Ship us duplicate of order number	MAESTRO
Ship duplicate of last order except one grade softer	MAGIAN
Ship duplicate of last order except one grade harder	MAGNA
Ship duplicate of last order except one number finer	MAGNATE
Ship duplicate of last order except two numbers finer	MAGNIFY
Ship duplicate of last order except one number coarser	MAGNOLIA
Ship duplicate of last order except two numbers coarser	MAGYAR
Shipped by express	MAGALLON
Shipped by freight	MAGANOM
Shipped by parcel post	MAGARI
Shipped part of your order today	MAGBISH
Balance will be shipped	MAGEN
When will you ship order?	MAGNET
Can you express at once?	MAGGESO
We will ship immediately	MAID
We will ship in a week's time	MAHOUT
We will ship in two week's time	MAJESTY
We will ship in three weeks' time	MALADY
We will ship in four weeks' time	MALAISE
When can you ship?	MAIS
We can ship	MAIN
If ordered at once we can ship	MAIZE
We can ship days after receipt of order	MAJOR
Impossible to ship until	MAJORCAN
Wire price of	MAB
Wire price and delivery of	MACE
Net price F. O. B. Philadelphia	MACEBAT
Quote by mail on	MAD
Quote by mail and say when you can deliver	MAGIC
Telegraph when you expect to ship	MAJADOR
Shall order be entered?	MAJAM
Refer to our letter of concerning	MEAT
Referring to your telegram of	MAJESTIC
Referring to our telegram of	MAKEMAN
Referring to our order number	MAKELESS
Can you ship from stock?	MAKESHIFT
Advise nearest you can ship from stock	MALICE

Telegraph and Cable Code (Continued)

If not in stock wire nearest in stock	MALIFER
Nearest in stock	MALIGIA
Can supply from stock	MALICNATO
None in stock	MALICA
Ship nearest in stock	MALIMBO
Must manufacture	MALKAR
How did you ship?	MAKE
Trace shipment of	MALE
Will have tracer sent	MALT
Price F. O. B. our works	MANAGE
Price F. O. B. ears New York	MANIA
Price F. O. B. steamer New York	MANY
Price F. O. B. steamer Philadelphia	MAPLE
Add to our order	MAR
Duplicate our order	MARST
Have no unfilled orders	MAT
Send what you can on order	MATCH
Send sample of stub of satisfactory wheel	MATTON
Sample or stub not received	MAY
Send sketch of wheels required	MEDAS
Sketch not received	MEAD
Advise description of work wheels are to be used on	MALLEJAN
Please reply to our letter of concerning	MALIGN
Enter order and hold for shipping instructions	MALIGNER
Entirely out of wheels must have shipment at once	MALISON
These wheels must be wire web	MALL
Ship elastic wheels on our order number	MALLARD
$\frac{3}{4}$ " safety taper	MALLETO
$\frac{1}{2}$ " safety taper	MALLADON
Order delayed account of mishap must make over	MALLOW

Style of Face

All wheels furnished square unless otherwise designated

B-Face . . . FACADE	F-Face . . . FACULTY	J-Face . . . FAINTNESS
C-Face . . . FACIAL	G-Face . . . FADED	K-Face . . . FAIRHOOD
D-Face . . . FACTION	H-Face . . . FAGOT	L-Face . . . FAIRINGS
E-Face . . . FACTORY	I-Face . . . FAINTED	

If shape required is shown on pages 49 to 112 use the Code Word given for that particular wheel to designate shape and dimensions. Code Words for grain and grade wanted should also be given.

Telegraph and Cable Code

For Wheel Dimensions

Diam. Inches	Code	Thickness Inches	Code	Size Hole Inches	Code	Grain	Code
1	Azaro	$\frac{1}{6}$	Buzz	$\frac{1}{8}$	Cymie	10	Dabble
4	Azetas	$\frac{3}{2}$	Buzzard	$\frac{3}{16}$	Cyclone	12	Dagger
8	Azgad	$\frac{1}{8}$	Buyer	$\frac{1}{4}$	Cycle	14	Dainty
1	Azimos	$\frac{3}{8}$	Buxifer	$\frac{5}{16}$	Cuttlass	16	Dairy
2	Azoie	$\frac{1}{4}$	Buxom	$\frac{3}{8}$	Cutting	20	Dance
5	Azotic	$\frac{5}{16}$	Boxer	$\frac{7}{16}$	Custard	24	Deacon
1	Azure	$\frac{3}{8}$	Button	$\frac{1}{2}$	Custom	30	Debate
2	Axabo	$\frac{7}{16}$	Butment	$\frac{9}{16}$	Cushion	36	Decay
1	Axati	$\frac{1}{16}$	Butler	$\frac{5}{8}$	Curve	46	Deface
4	Axeman	$\frac{9}{16}$	Business	$\frac{11}{16}$	Current	50	Default
1	Axial	$\frac{5}{16}$	Bushel	$\frac{3}{4}$	Curly	60	Defer
1	Axicorn	$\frac{3}{8}$	Burrow	$\frac{4}{5}$	Cupola	70	Define
1	Axillary	$\frac{7}{8}$	Burst	1	Cubie	80	Delay
1	Axinite	1	Bundle	$\frac{1}{8}$	Crust	90	Delude
2	Axiom	$\frac{1}{8}$	Bullock	$\frac{1}{4}$	Crumb	100	Demand
2	Axius	$\frac{1}{16}$	Bullet	$\frac{1}{32}$	Cruel	120	Demon
3	Awoke	$\frac{1}{8}$	Bulk	$\frac{1}{16}$	Crude	150	Dense
3	Awkward	$\frac{1}{16}$	Build	$\frac{1}{8}$	Crown	180	Dent
4	Awhile	$\frac{1}{8}$	Bugloss	$\frac{1}{4}$	Cross	220	Dental
4	Awning	$\frac{1}{3}$	Bugle	$\frac{1}{8}$	Croak	F	Depart
5	Awful	$\frac{1}{8}$	Buffoon	2	Critic	24	Comb. Depict
6	Aware	2	Buffet	$2\frac{1}{4}$	Crisp		
7	Await	$2\frac{1}{2}$	Buckle	$2\frac{1}{2}$	Creep		
8	Avoid	$2\frac{1}{2}$	Bubble	$2\frac{3}{4}$	Cream		
9	Avert	$2\frac{3}{4}$	Bruiser	3	Crank		
10	Avast	3	Brook	$3\frac{1}{4}$	Cranium		
12	Avail	$3\frac{1}{2}$	Bronze	$3\frac{1}{2}$	Crane		
14	Autumn	$3\frac{1}{2}$	Brink	$3\frac{3}{4}$	Cranberry		
15	Authority	$3\frac{3}{4}$	Brighton	4	Cramp		
16	Author	4	Brave	$4\frac{1}{4}$	Craft		
18	Aureole	$4\frac{1}{2}$	Bravado	$4\frac{1}{2}$	Cradle		
20	Audit	5	Brass	$4\frac{3}{4}$	Crack		
22	Auburn	6	Brand	5	Crab		
24	Attract	7	Branch	$5\frac{1}{2}$	Cozy		
26	Attire	8	Brake	6	Coyote		
28	Attack			$6\frac{1}{2}$	Coxcomb		
30	Atlas			7	Cowslip		
36	Atlantic			$7\frac{1}{2}$	Cowhide		
40	Atom			8	Coward		
				$8\frac{1}{2}$	Covert		
				9	Cousin		
				$9\frac{1}{2}$	Courtesy		
				10	Court		
				$10\frac{1}{2}$	Courage		
				12	Coupon		

Telegraph and Cable Code

Class of Work

Grinding rough castings	MANNISH
Grinding rough steel castings	MANATEE
Grinding small steel castings	MANDARM
Grinding small malleable-iron castings	MANDATE
Grinding large malleable-iron castings	MANDIBLE
Grinding light cast-iron castings	MANDRAKE
Grinding heavy cast-iron castings	MANE
Grinding chilled iron castings	MANEGE
Grinding wrought iron	MANGER
Grinding brass and bronze castings	MANGO
Grinding rough work in general	MANIFOLD
Grinding lathe and planer tools	MANIKIN
Grinding small lathe and planer tools	MANIPLE
General machine shop use	MANNA
Grinding wood-working tools	MANSE
Grinding stove fittings	MANTEL
Surfacing steel-tempered plows	MANUAL
Surfacing soft-steel plows	MARAUD
Surfacing chilled iron plows	MARBLE
Surfacing hardened steel	MARGAY
Grinding molding bits and cutters	MARINE
Gumming and sharpening saws	MARITAL
Reamers, taps, milling cutters, etc. (hand grinding)	MARMOT
Reamers, taps, milling cutters, etc. (special machines)	MAROON
Drop forgings	MARPLOT
Car-wheel grinding	MARQUE
Grinding knives on automatic grinder	MARRIAGE
Soft steel spindles on universal grinder	MARSH
Hardened steel spindles on universal grinder	MARVEL

Domestic Distributors of Abrasive Wheels

<i>Atlanta, Georgia</i>	FULTON SUPPLY CO.
<i>Baltimore, Maryland</i>	THE EASTERN HARDWARE CO.
<i>Beloit, Wisconsin</i>	BICKNELL MANUFACTURING CO.
<i>Boston, Massachusetts</i>	R. B. MCKIM CO.
<i>Cedar Rapids, Iowa</i>	CEDAR RAPIDS PUMP CO.
<i>Chattanooga, Tennessee</i>	MILLS & LUPTON SUPPLY CO.
<i>Chicago, Illinois</i>	ABRASIVE COMPANY No. 566 W. Washington Blvd.
<i>Cincinnati, Ohio</i>	DOERMANN-ROEHRER CO.
<i>Cleveland, Ohio</i>	STRONG, CARLISLE & HAMMOND CO.
<i>Des Moines, Iowa</i>	IOWA MACHINERY & SUPPLY CO.
<i>Detroit, Michigan</i>	BUHL SONS CO.
<i>Dubuque, Iowa</i>	GEORGE W. HEALEY CO.
<i>Duluth, Minnesota</i>	MARSHALL-WELLS HARDWARE CO.
<i>Easton, Pennsylvania</i>	LOSEY & CO.
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<i>Janesville, Wisconsin</i>	BICKNELL MANUFACTURING CO.
<i>Johnson City, Tennessee</i>	SUMMERS HARDWARE CO.
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<i>Lancaster, Pennsylvania</i>	HERR & CO.
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<i>Manitowoc, Wisconsin</i>	J. J. STANGEL HARDWARE CO.
<i>Menominee, Michigan</i>	NORTHERN HARDWARE & SUPPLY CO.
<i>Merrill, Wisconsin</i>	MERRILL IRON WORKS
<i>Milwaukee, Wisconsin</i>	PHILLIP GROSS HARDWARE & SUPPLY CO.
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<i>Richmond, Virginia</i>	SOUTHERN RAILWAY SUPPLY CO.
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<i>Scranton, Pennsylvania</i>	BITTENBENDER CO.
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<i>Uruguay, S. A.</i>		
<i>Peru, S. A.</i>	ENRIQUE HUMPHREYS & CO.	Lima

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